

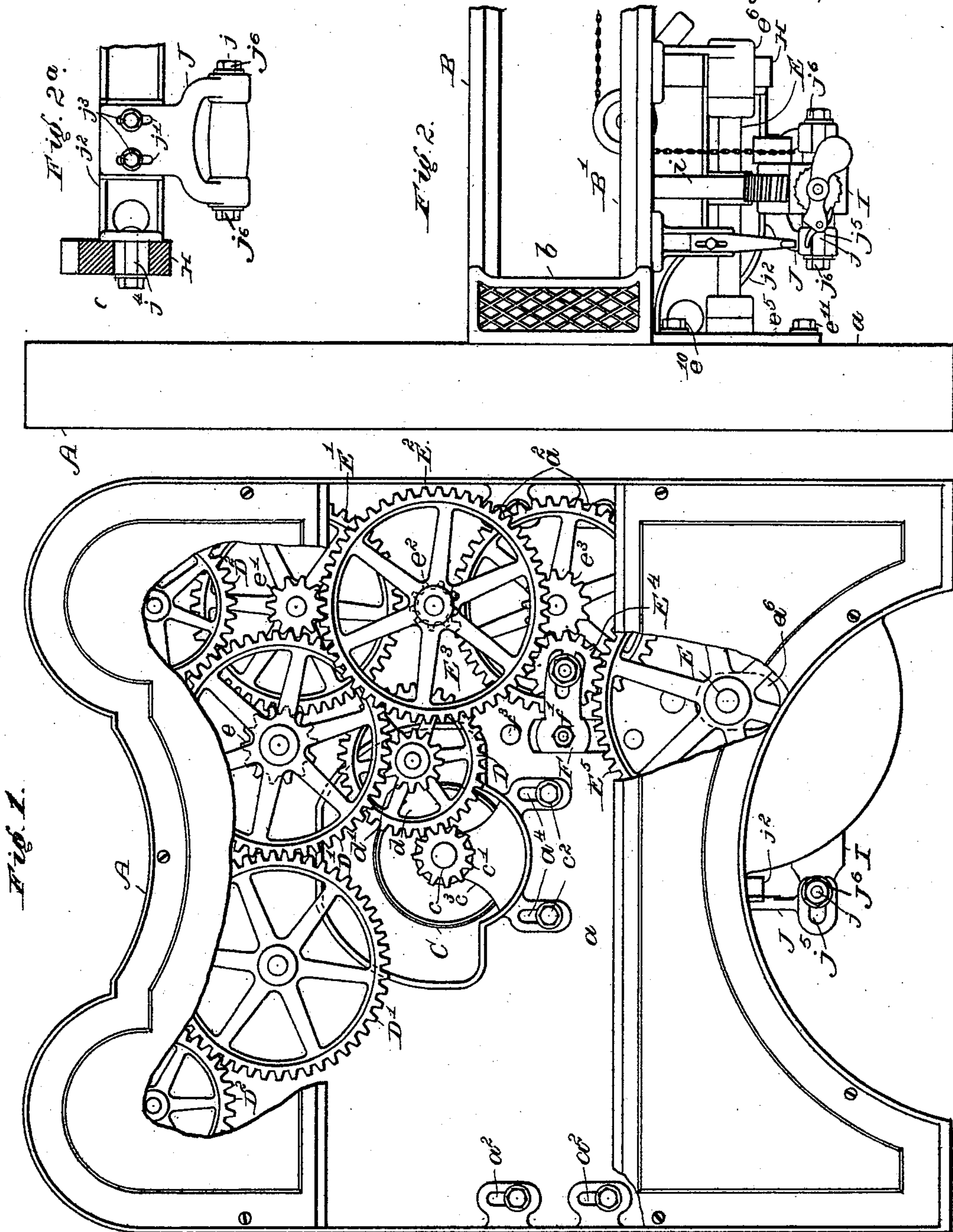
(No Model.)

3 Sheets—Sheet 1.

A. D. CHANDLER.  
RING SPINNING FRAME.

No. 582,268.

Patented May 11, 1897.



WITNESSES.

*Hirshy Spole.*  
*Myrtie L. Beale.*

INVENTOR

*Alfred D. Chandler,*  
By *Albert M. Moore,*  
*His* ATTORNEY.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

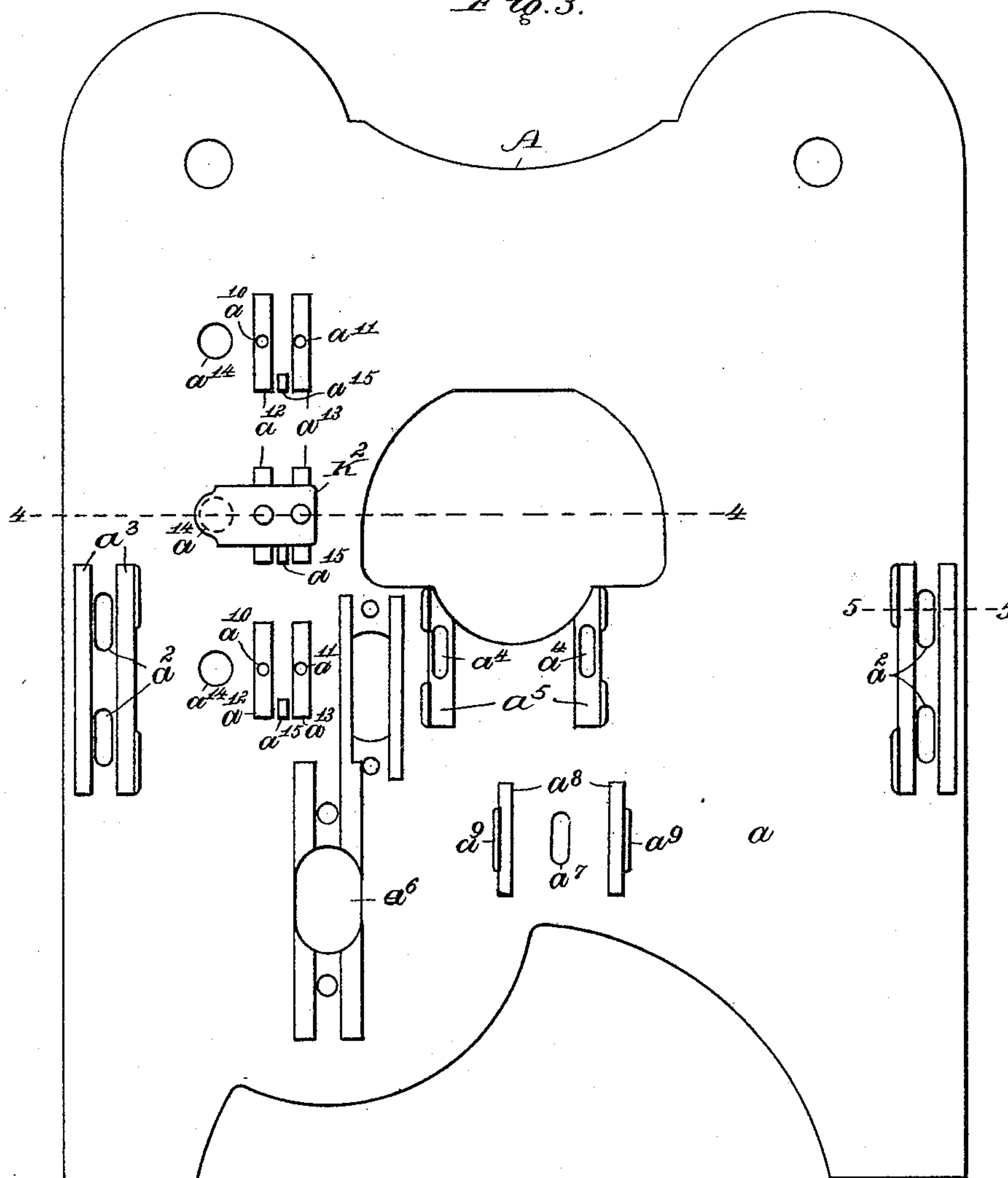


Fig. 4.

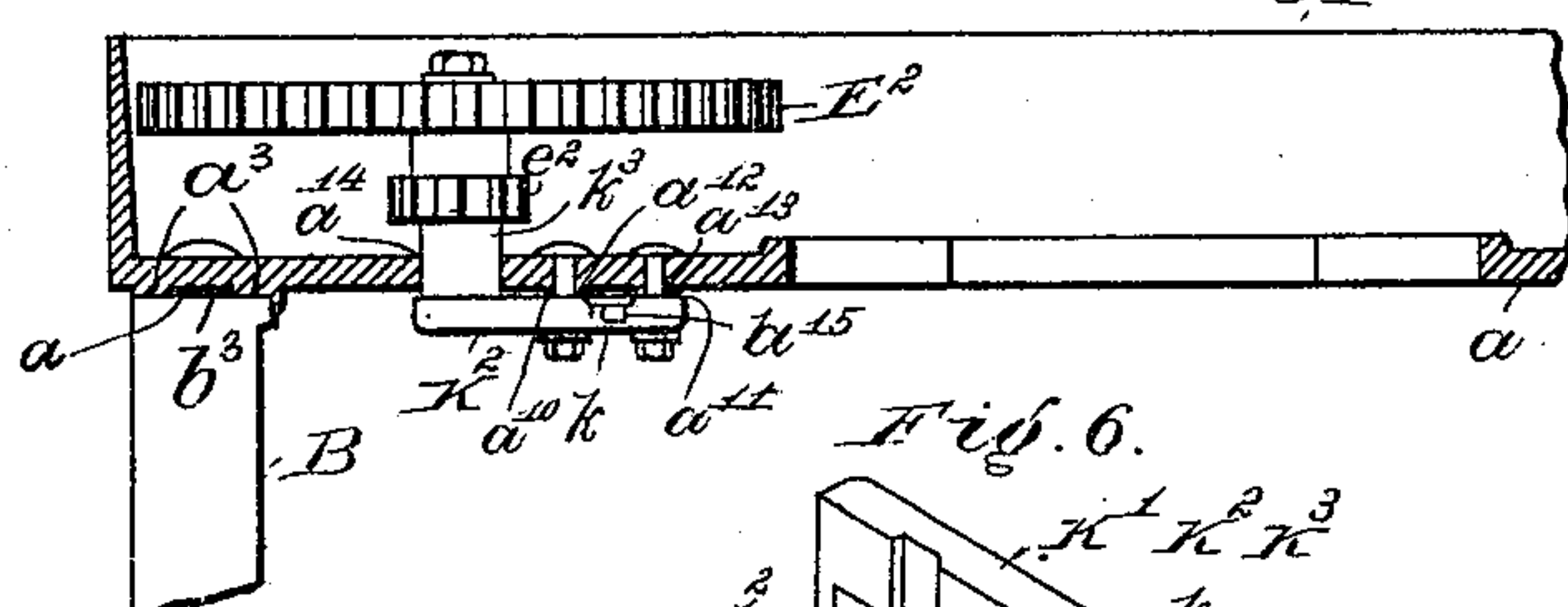


Fig. 5.

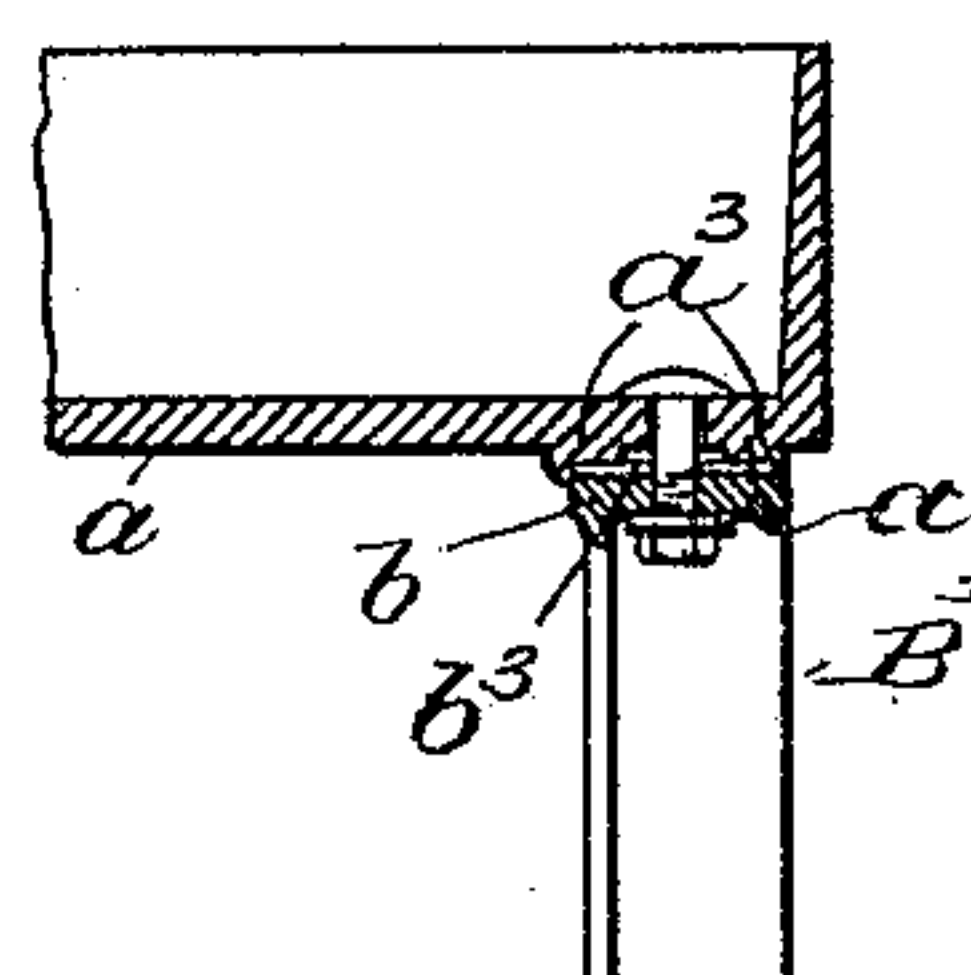
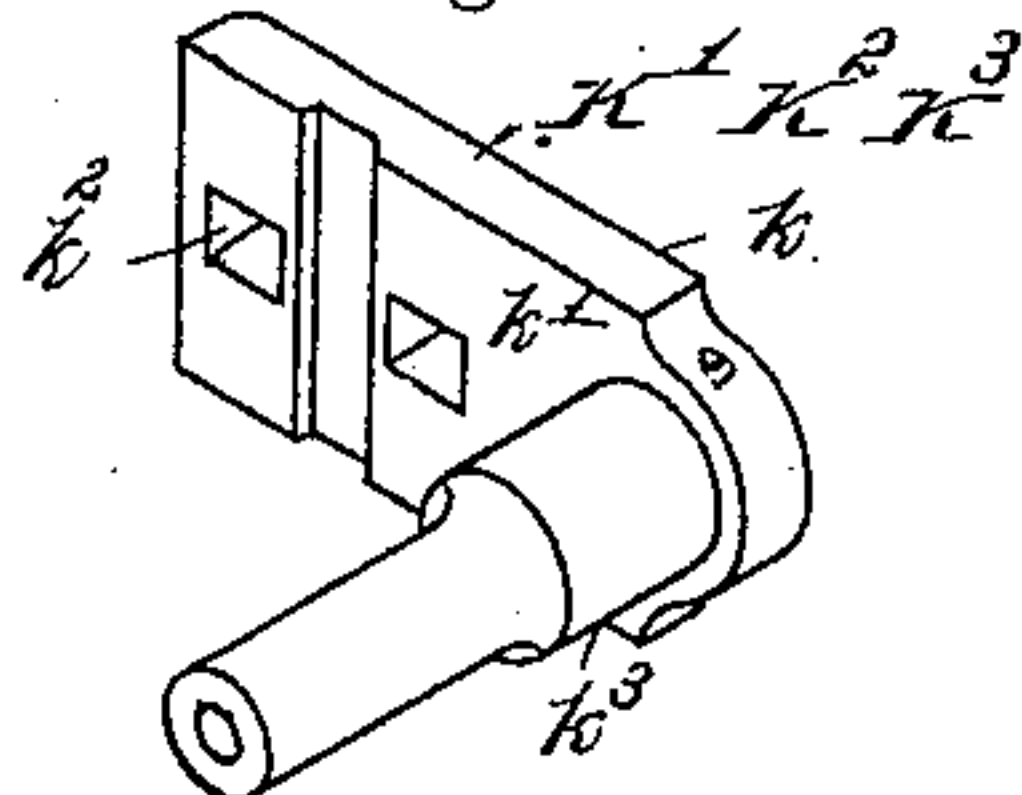


Fig. 6.



WITNESSES.

Kirkley & Hyde,  
Myrtie G. Beale.

INVENTOR

Alfred D. Chandler,

By Albert M. Moore,  
His ATTORNEY.



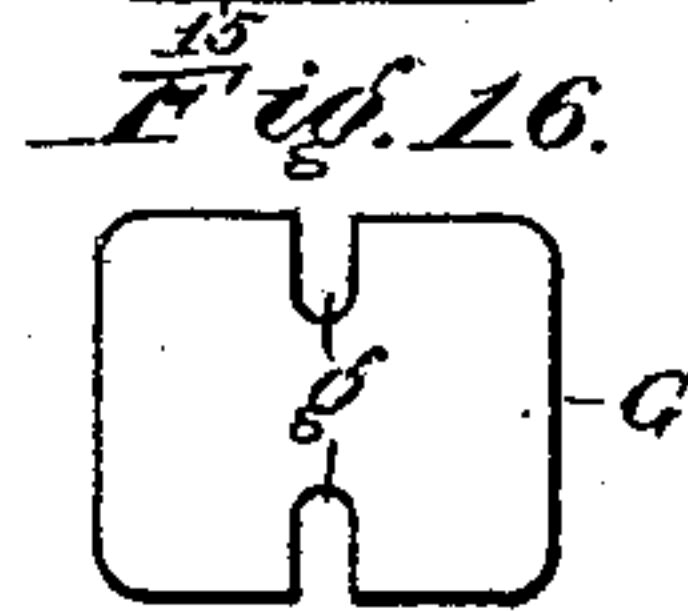
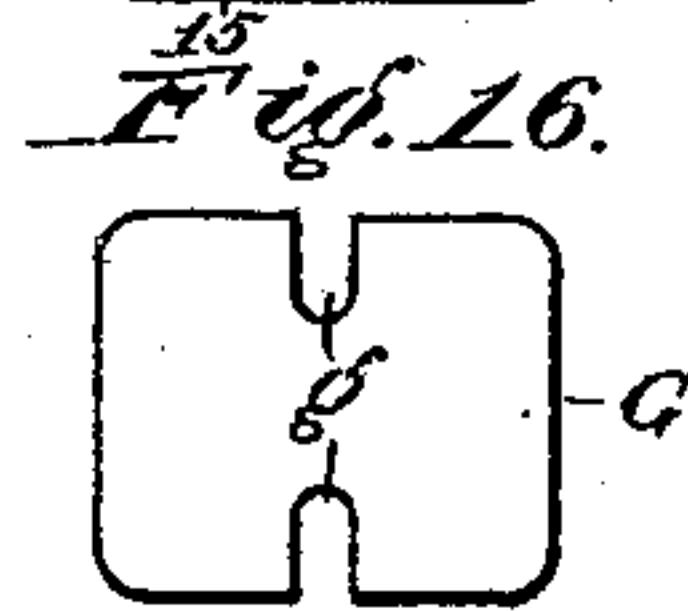
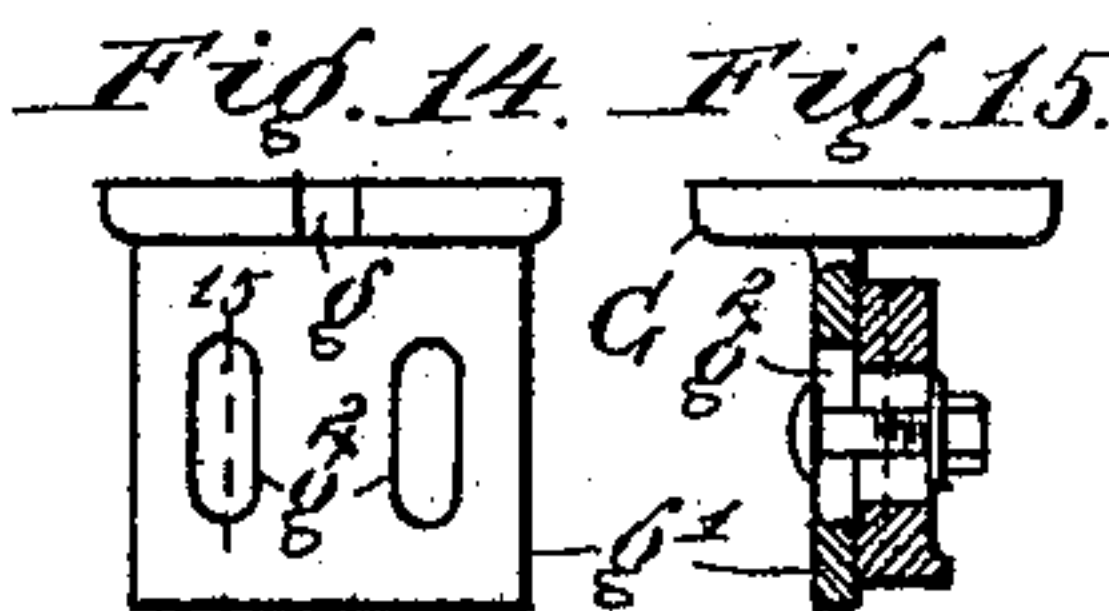
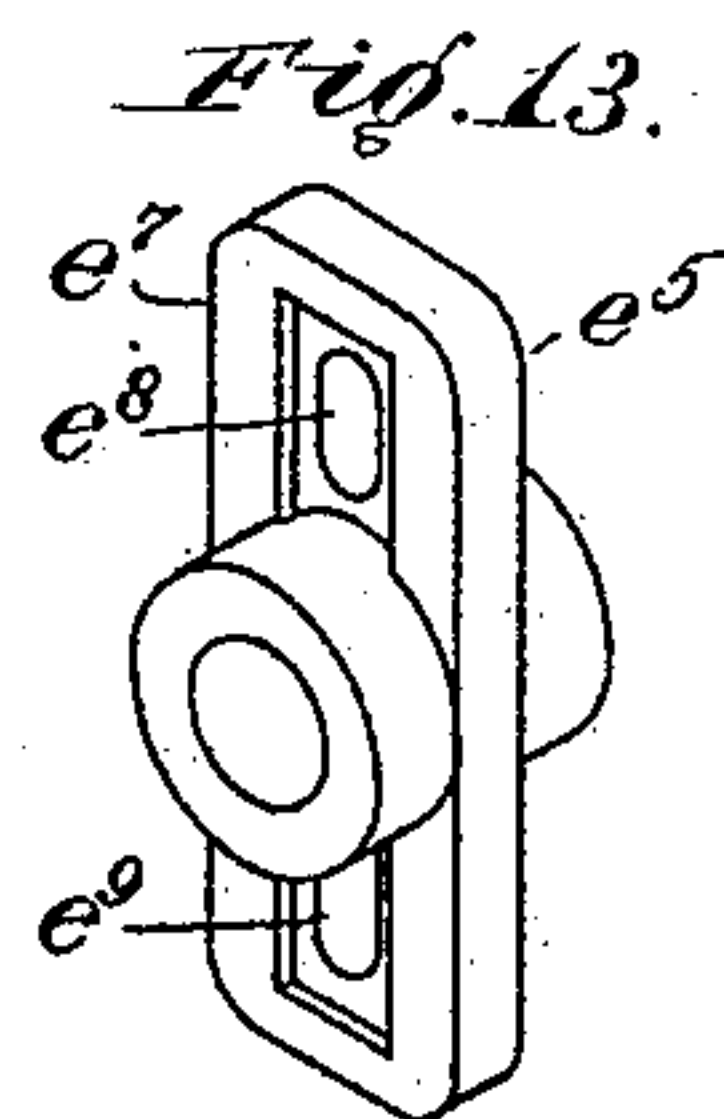
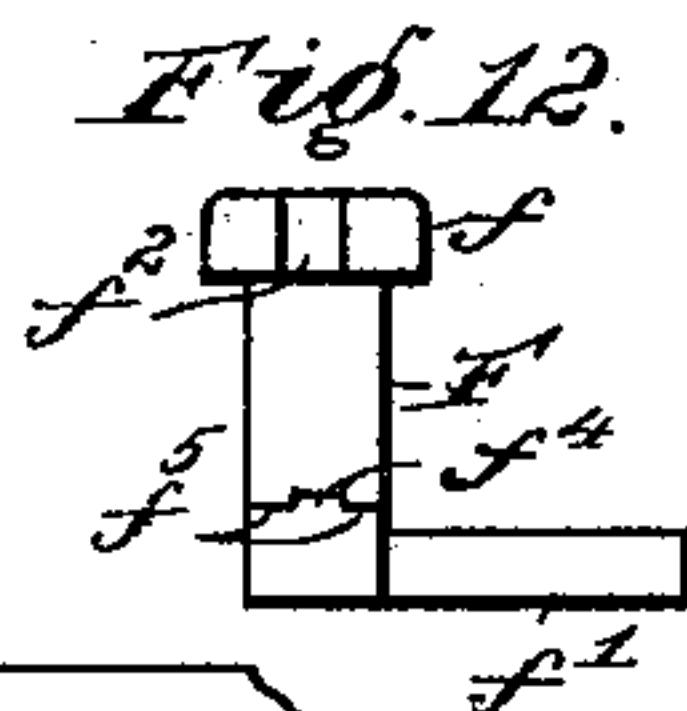
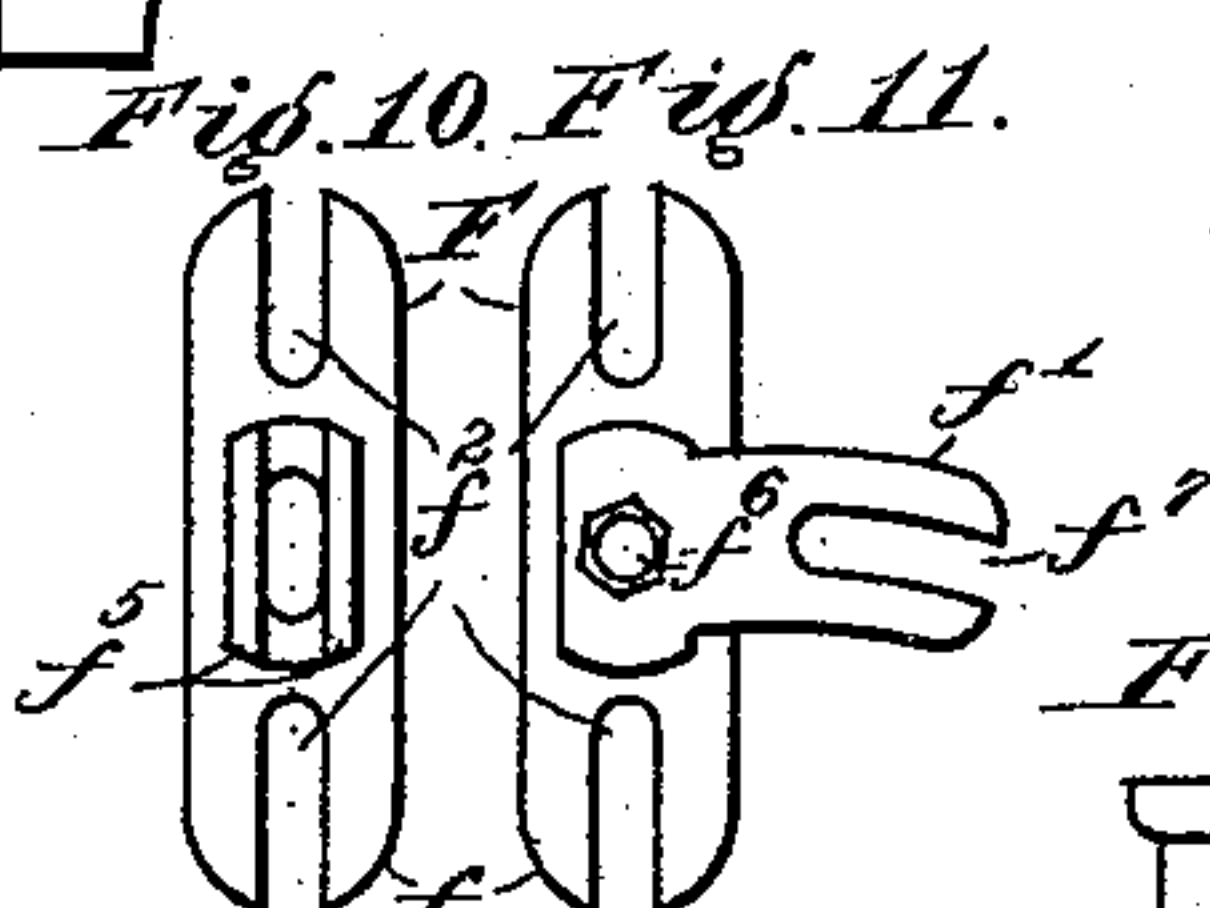
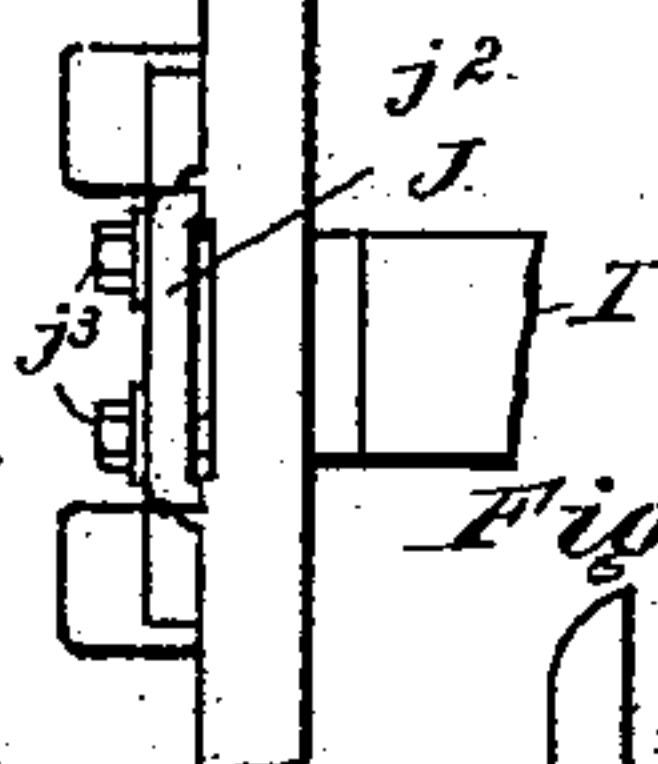
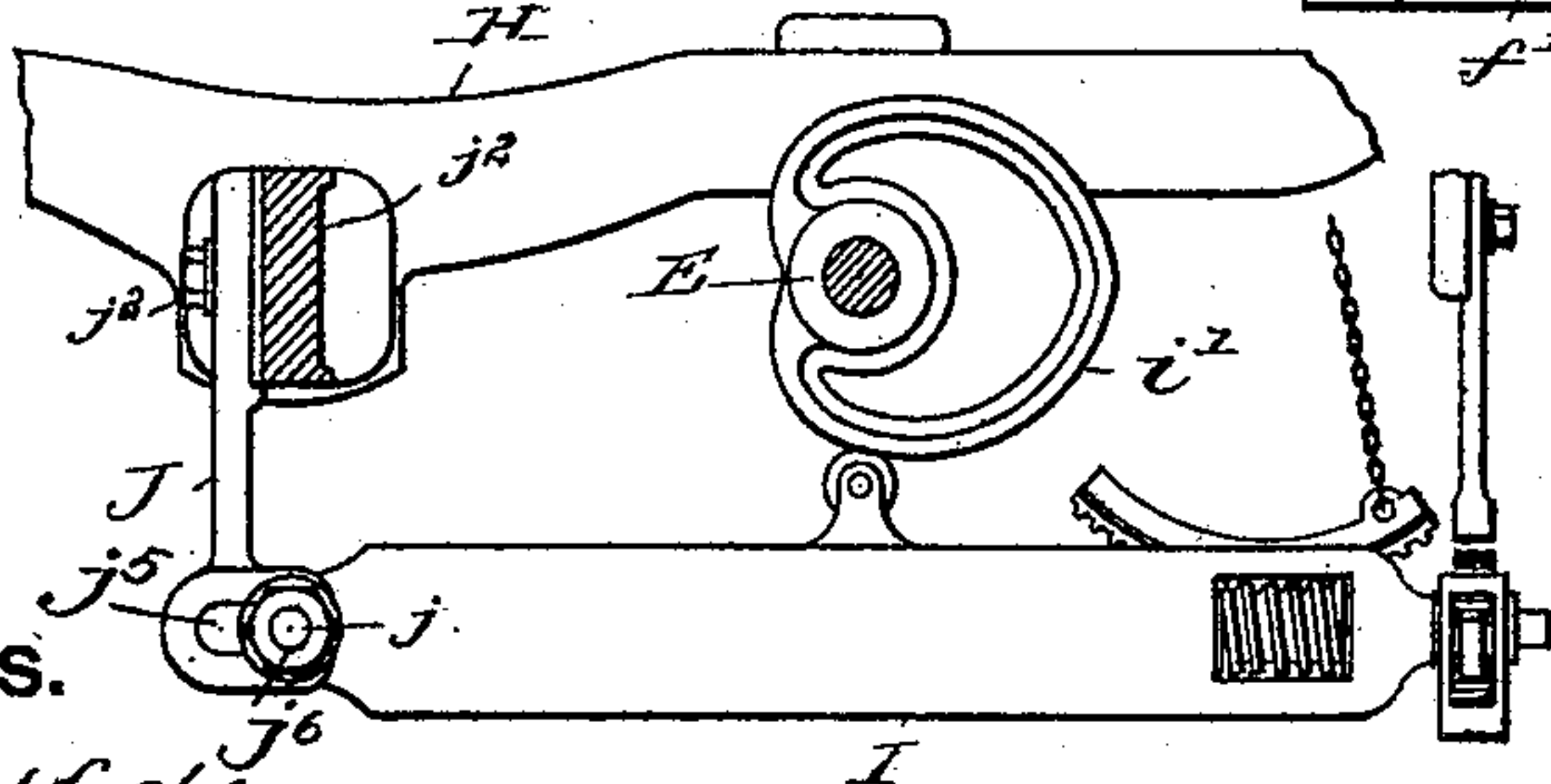
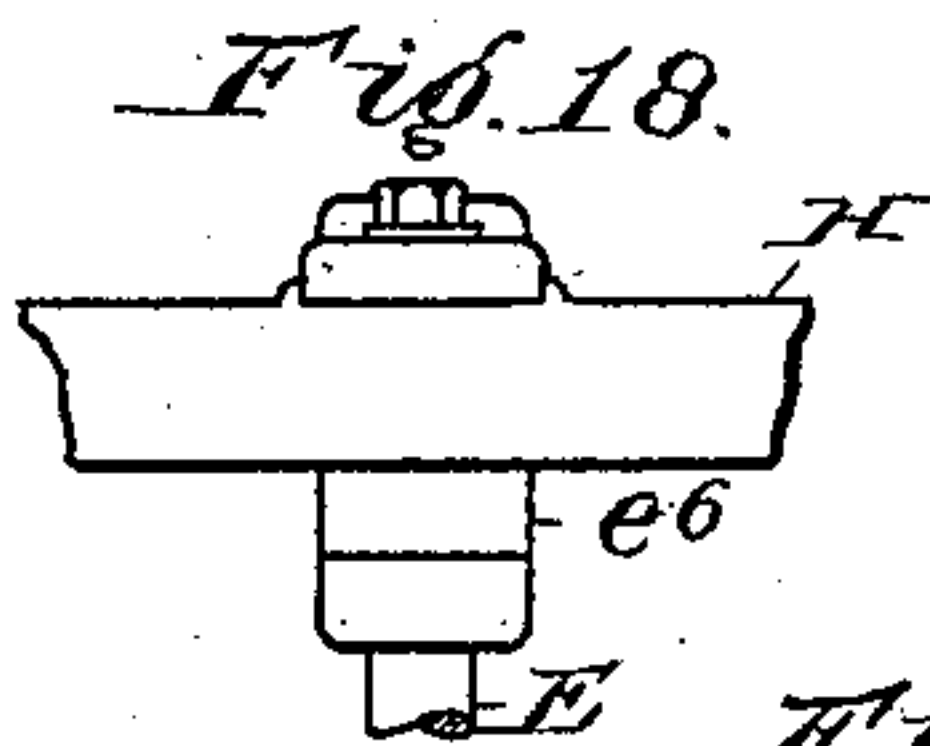
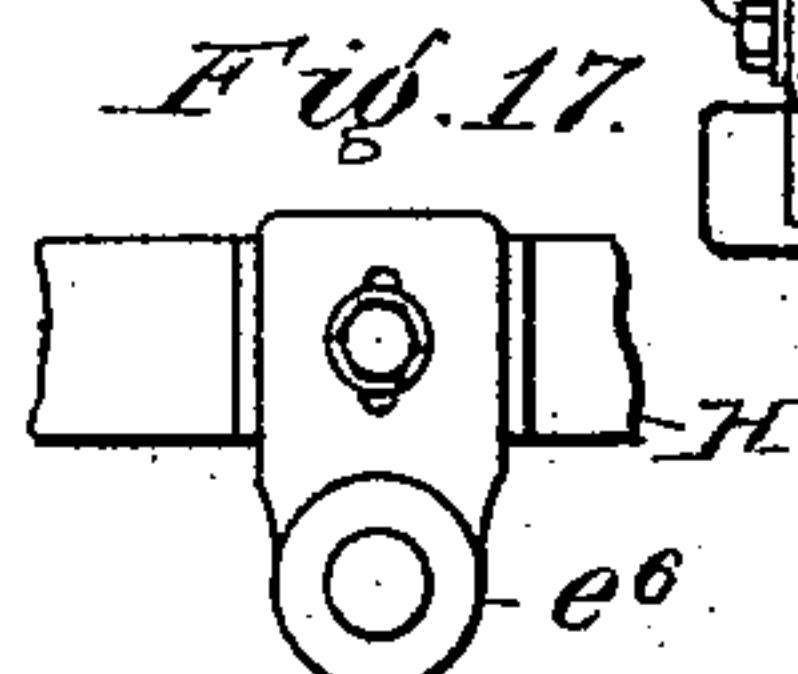
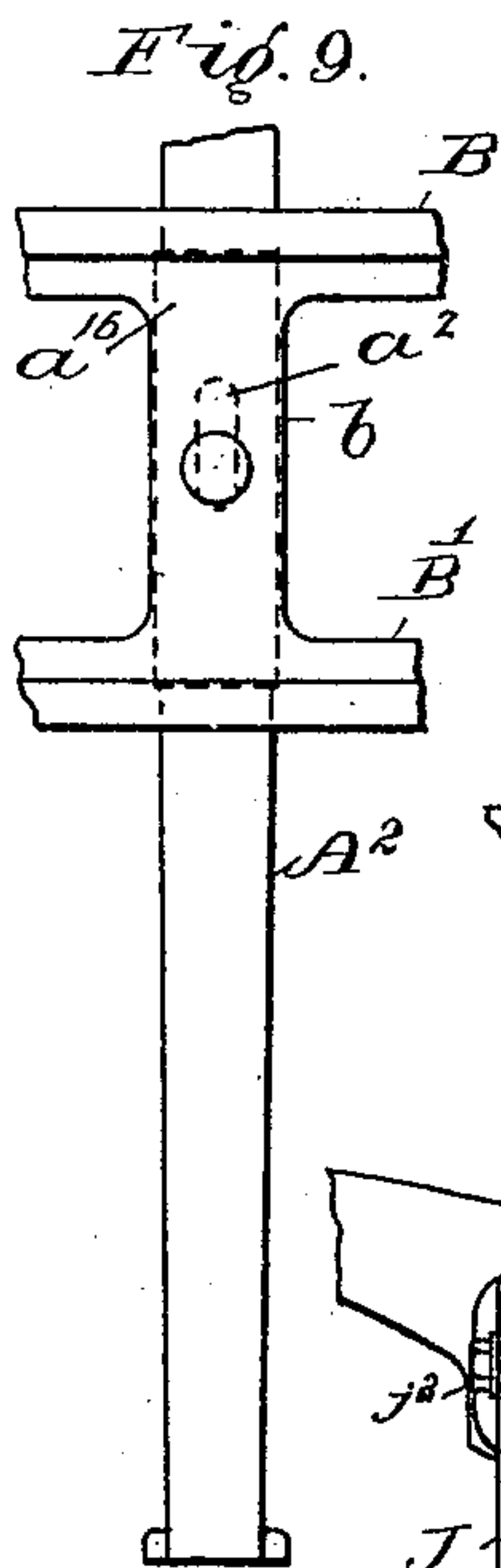
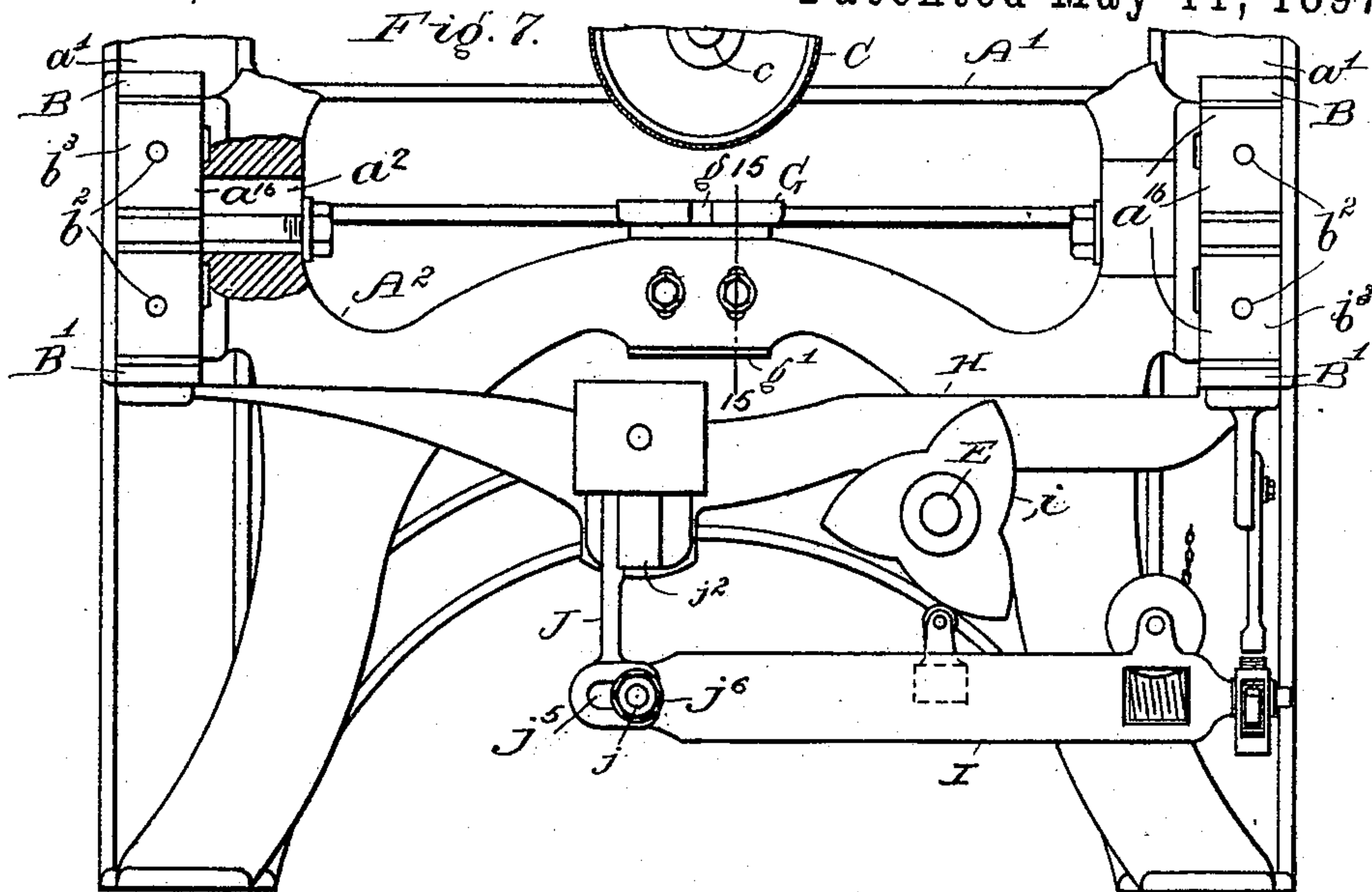
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# WITNESSES.

Hickley Sept.<sup>7</sup>  
Myrtie C. Beale

**INVENTOR**

Alfred D. Chandler,  
By *Albert M. Moore,*  
*His* ATTORNEY.



# UNITED STATES PATENT OFFICE.

ALFRED D. CHANDLER, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE  
LOWELL MACHINE SHOP, OF MASSACHUSETTS.

## RING-SPINNING FRAME.

SPECIFICATION forming part of Letters Patent No. 582,268, dated May 11, 1897.

Application filed October 15, 1892. Serial No. 448,927. (No model.)

*To all whom it may concern:*

Be it known that I, ALFRED D. CHANDLER, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Ring-Spinning Frames, of which the following is a specification.

My invention relates to ring-spinning frames; and it consists in the devices and combinations hereinafter described and claimed, the principal objects of said invention being to render certain parts of the same so adjustable as to enable longer or shorter cops to be spun—that is, to allow longer or shorter bobbins to be used—to drive the builder-motion by a train of gears and thereby to prevent backlash or dwell of the ring-rail at the ends of its traverse, to vary the taper of the cops, to increase the stability of the builder, and to lessen the cost of repairs and to save the time consumed in such repairs.

Ring-spinning frames as usually constructed are adapted for bobbins of a single length only and are practically useless for bobbins of much greater or less length. It is therefore necessary for builders of such frames to keep a large stock of patterns of frame ends and frame-supports, and heretofore it has been necessary, in changing from longer to shorter bobbins or from shorter to longer, to have new frames built to receive the new bobbins.

By means of the improvement herein described from a single set of patterns the ring-spinning frame may be set up to receive bobbins of any length now used, and, after being operated with bobbins of one length, may be quickly changed, at a slight expense, to receive bobbins of a greater or less length, the principal change theoretically required being so to vary the height of the spindle-rail as to bring the tops of the bobbins at a suitable distance from the yarn-guides, because the yarn-guides cannot properly be raised or lowered, as this varies the angle at which the yarn leaves the drawing-rolls, and the length of contact between the yarn and lower drawing-roll affects the twist of the yarn and its

liability to break; but in practice varying the height of the spindle-rail necessitates several other changes, which will be described herein.

The builder-motion is commonly driven by a worm which engages a worm-gear fast on the builder-shaft, the worm being driven by a chain from the shaft of the band cylinder or drum which rotates the spindles, or the worm is driven from the so-called “intermediate” gear, which is driven from the band-cylinder shaft or main shaft of the machine and drives the front drawing-roll, and the worm-gear is connected through a train of gears to said builder-shaft, the use of a worm and worm-gear being to get a greatly-reduced speed from the band-cylinder to the builder-shaft, the band-cylinder having about twelve hundred revolutions a minute, while the builder-shaft makes from one-quarter to one-half of a revolution in the same time. The objections to the use of a worm and worm-gear are that they are with difficulty made accurate, work with great friction, and consequently soon become worn and allow of a backlash, which causes or permits of a dwell at each end of the traverse of the ring-rail, which results in annular ridges of yarn at the ends of the cop, (instead of the perfect tapers desired,) these ridges falling over and snarling the yarn and preventing the yarn from being unwound from the bobbins. To adjust the worm and worm-gear requires an experienced workman and the stopping of the machine for a considerable time.

By driving the builder-shaft by a train of accurately-constructed gears, as herein described, said builder-shaft will be operated without backlash or dwell and the gears will last, without repairs, as long as the rest of the frame. I vary the taper of the cops, when the machine is used to spin warp-yarns, by raising or lowering the fulcrum or so-called “heel” of the builder, raising said heel lengthening the taper at the bottom of the bobbin, and lowering said heel increasing the taper at the top of said bobbin. The taper of the nose of filling-cops is usually caused by the conical shape of the head or enlarged part of the bobbin. I increase the stability



of the builder by supporting it equally on both sides, instead of on one side, as heretofore commonly practiced.

In the accompanying drawings, on three sheets, Figure 1 is an elevation of the foot end of a ring-spinning frame constructed in accordance with my invention, the middle door being removed to show the means of supporting and adjusting the spindle-rail and the guide-rail and to show the train of gears which drive the drawing-rolls and the builder-shaft and means of adjustably supporting the drum or band-cylinder; Fig. 2, a front elevation of the foot end, spindle-rail, guide-rail, and builder mechanism, showing also the builder-girth and builder-girth brace; Fig. 2<sup>a</sup>, a rear elevation of the builder-girth brace and adjustable builder-hanger and a vertical section of the builder-girth; Fig. 3, an elevation of the inner side of the foot end and of the intermediate gear-stand shown in Fig. 4 and the chipping-surfaces or bearing-surfaces for the different rails and gear-stands; Fig. 4, a section of the foot end, showing in plan a part of the spindle-rail and one of the intermediate gears, the pinion concentric therewith, and the stand which supports said gear and pinion; Fig. 5, a section on the line 5-5 in Fig. 3, said section passing through the web which unites the spindle-rail and guide-rail, and a plan of part of the guide-rail; Fig. 6, an isometric perspective view of the gear-stand shown in Figs. 3 and 4; Fig. 7, an end elevation of the spindle-rails and guide-rails, the builder-girth and builder-girth brace, the builder-cam as used in spinning filling-yarn, the builder arm or lever, the builder-hanger, a part of the band-cylinder, a support, the adjustable table on which the intermediate journal-boxes of the band-cylinder are supported, and an inner elevation of the head end, the upper parts of said head end and support being omitted; Fig. 8, a plan of parts of the builder-girth and builder-girth brace, the builder-hanger, and a part of the builder arm or lever; Fig. 9, a front view of a part of a support, showing the adjacent parts of the spindle-rail and guide-rail and the means of securing them to said support; Fig. 10, an elevation of the face next the foot end of the plate of the compound stand which supports the intermediate gear which engages the builder-shaft gear and its driving-gears; Fig. 11, a similar elevation of said plate and arm; Fig. 12, a plan of the same; Fig. 13, an isometric perspective view of the stand which supports the outer end of the builder-shaft; Fig. 14, a side elevation of the adjustable table which supports intermediate journal-boxes of the band-cylinder; Fig. 15, a rear elevation of said table and a vertical section of the leg of said table and of a support on the line 15-15 in Fig. 7; Fig. 16, a plan of said table; Fig. 17, a right side elevation of the hanger which supports the end of the builder-shaft farthest from the foot end and part of a cross-girth; Fig. 18, a

plan of the last-named hanger, part of the builder-shaft, and part of a cross-girth; Fig. 19, a left side elevation of the builder-girth, the builder arm or lever, builder-hanger, the builder-cam, rack, worm, ratchet, and operating-finger as used in spinning warp-yarns and a vertical section of the builder-girth brace.

The foot end A, or end farthest from the driving-pulleys, (not shown,) the head end A' and supports A<sup>2</sup>, the spindle-rail B and guide-rail B', the band-cylinder C, its shaft c, which is also the main shaft of the machine, and the pinion c', fast on said shaft c, are of the usual construction and perform the usual functions, except as hereinafter stated.

The spindle-rail B and guide-rail B' are commonly cast in one piece, as shown in Figs. 7 to 9, being connected by webs b b' at the ends and at each support, and said ends are fitted against the inner face of the ends A A' and secured thereto by bolts which pass through the inner plates a a' of said ends A A' and into holes b<sup>2</sup> in said rails, and in like manner said rails are commonly secured to the supports A<sup>2</sup> by bolts which pass through the webs b and through said supports, but the holes which receive the bolts in both cases are just of a size and shape to fit said bolts and do not allow of any vertical movements of said bolts.

Instead of round holes I provide the ends and other supports, Figs. 1 and 9, with vertical slots a<sup>2</sup>, which allow the rails B B' to be secured at any height which may be necessary to bring the tops of the bobbins at the proper distance from the yarn-guides. It will be understood that the ends of the rails are provided in the usual manner with proper surfaces b<sup>3</sup> and the ends A A' with similar surfaces a<sup>3</sup>, which are made vertical or at right angles to the axes of said rails, and in a similar manner the supports A<sup>2</sup> are provided with similar vertical chipping-surfaces a<sup>16</sup>, and I make all these bearing-surfaces or chipping-surfaces of sufficient length to allow the rail to have a proper bearing at any height.

Raising or lowering the rails B B' of course raises the spindles supported on the rail B and the whirls of said spindles and requires the band-cylinder C to be adjusted accordingly. The band-cylinder stands c<sup>3</sup> are secured by bolts c<sup>2</sup> to the ends A A', but these bolts c<sup>2</sup>, instead of entering and filling round holes in the inner plates a a' in the usual manner, enter vertical slots a<sup>4</sup> of a sufficient length to allow of a proper adjustment of said band-cylinder, and the usual bearing or chipping surfaces a<sup>5</sup> are accordingly lengthened to furnish a proper support for said stands c<sup>3</sup>.

The band-cylinder shaft or main shaft c carries a pinion c', called the "drum-gear," which engages the jack-gear D, supported on the swing-stand d. A pinion d', concentric with and turning with the jack-gear D, engages one of the intermediate roll-gears D',



said gears D' engaging each other and each engaging a front drawing-roll gear D<sup>2</sup> in the usual manner. A pinion *e* is concentric with and turns with the intermediate roll-gear D' which is nearest the front of the machine and engages the first builder-gear E', and another pinion *e'*, concentric with said gear E' and turning therewith, engages the second builder-gear E<sup>2</sup>. Another pinion *e*<sup>2</sup>, concentric with and fast to the gear E<sup>2</sup>, engages a third builder-gear E<sup>3</sup>, and another pinion *e*<sup>3</sup>, which rotates with the gear E<sup>3</sup>, engages the intermediate builder-gear E<sup>4</sup>, said last-named gear engaging the builder-shaft gear E<sup>5</sup>. The train of pinions and gears beginning with the pinion *e* and ending with the pinion *e*<sup>3</sup> have not heretofore been used.

The intermediate builder-gear E<sup>4</sup> is adjustable by means of the compound stand F, consisting of the plate *f* and the forked arm *f'*, as shown in Figs. 1 and 10 to 12, said plate *f* having open-ended slots *f*<sup>2</sup>, secured by bolts *f*<sup>3</sup> to the inner plate *a* of the foot end A to permit said plate *f* to be vertically adjusted, and said forked arm *f'* having a vertical rib *f*<sup>4</sup>, which has a sliding fit between vertical ribs *f*<sup>5</sup> on said plate *f*, which allows of the forked arm being properly placed on the plate *f* when the machine is set up and prevents said fork from turning, said arm *f'* and said plate *f* being secured to each other by a bolt *f*<sup>6</sup>. The fork *f*<sup>7</sup> or end slot of the arm *f'* is concentric with the builder-shaft E and with the gear E<sup>5</sup> to allow said gear E<sup>4</sup> to be adjusted toward or from the center of the pinion *e*<sup>3</sup> and to allow of the pinion *e*<sup>3</sup> being changed for a larger or smaller pinion to give a greater or less speed to the shaft E and the plate *f*, or, in other words, the stand F as a whole is adjustable to enable the gear E<sup>4</sup> to be raised or lowered when said builder-shaft E is raised or lowered.

The band-cylinder C is usually divided transversely into short cylinders or sections and the shaft *c* of said band-cylinder is not continuous from end to end of the machine, one section of said shaft carrying the driving-pulley and being supported in a band-cylinder stand *c*<sup>3</sup> like what is shown in Fig. 1, and another end section of said shaft carrying the pinion *c'*, above mentioned, at the foot end of the machine, and the different sections of the band-cylinder being connected to each other concentrically by other short sections of the shaft *c* in the usual manner. Each section of the shaft *c* between sections of the band-cylinder is supported in journal-boxes, the construction of which is well known and is not shown in the drawings, but which intermediate journal-boxes must be raised or lowered when the band-cylinder is raised or lowered and must also, to avoid the necessity for extreme accuracy in the construction of the parts, be adjustable laterally to make the axes of all the sections of the shaft *c* in the same straight line and to bring said journal-boxes at the proper places between the sections of the

band-cylinder. I therefore support these intermediate journal-boxes upon adjustable tables G, the form of which is shown in Figs. 7 and 14 to 16, the top or table proper being provided with slots *g*, such as have heretofore been used in the unadjustable tables usually cast on the centers of the support, and the leg *g'* or vertical part of each table being provided with one or more vertical slots *g*<sup>2</sup>, through which bolts are driven into the support A<sup>2</sup>, these vertical slots allowing a vertical adjustment of the table and the slots *g* allowing a lateral adjustment of the journal-boxes on said table G.

The builder-shaft E is of the usual construction, but instead of being supported at each end in immovable journal-boxes is capable of being raised and lowered, the plate *a* of the foot end having a vertical slot *a*<sup>6</sup>, through which said builder-shaft passes, said shaft being supported in pipe-boxes *e*<sup>5</sup> *e*<sup>6</sup>, the pipe-box *e*<sup>5</sup> having a foot *e*<sup>7</sup>, provided with vertical slots *e*<sup>8</sup> *e*<sup>9</sup>, as shown in Fig. 13, through which bolts are driven, said bolts *e*<sup>10</sup> *e*<sup>11</sup> passing through the plate *a* of the foot end A, and the other pipe-box *e*<sup>6</sup> being secured to the builder-girth H, as shown in Figs. 17 and 18, and said builder-girth H being secured to the guide-rails B' at the front and back of the machine.

The builder I is of the common construction, the form of the builder shown in Fig. 7 being such as is commonly used in ring-frames for spinning filling and the form of the builder shown in Fig. 19 being such as is commonly used in ring-frames for spinning warp-yarn. The builder-arm or builder-lever, instead of being supported in the usual manner by a stud which projects horizontally from the builder-girth and is supported at one end only, turns on a horizontal stud *j*, supported in a forked hanger J, provided with vertical slots *j'*, through which and through holes in the builder-girth brace *j*<sup>2</sup> bolts *j*<sup>3</sup> are passed to secure said hanger to said brace, as shown in Fig. 2<sup>a</sup>. The builder-girth brace *j*<sup>2</sup> is secured by a bolt *j*<sup>4</sup> to the builder-girth H, which, as above stated, is secured to the guide-rails, and therefore rises and falls with said guide-rails, and to the foot end by a bolt which passes through a vertical slot *a*<sup>7</sup> in the plate *a*, the end of said brace being held against the chipping-surfaces *a*<sup>8</sup> between two vertical ribs *a*<sup>9</sup>, which prevent the tipping of said brace. The stud *j* is adjustable in horizontal slots *j*<sup>5</sup> in the forked hanger J (when the holding-nuts *j*<sup>6</sup>, which turn on said stud *j* against said hanger, are loosened) to vary the throw of the builder-cam, (*i*, Fig. 7, *i'*, Fig. 19.)

The gears E' E<sup>2</sup> E<sup>3</sup> are each supported on stands K' K<sup>2</sup> K<sup>3</sup>, (shown in Fig. 6,) each stand having a foot *k*, provided with two bolt-holes *k'* *k*<sup>2</sup>, through which and through holes *a*<sup>10</sup> *a*<sup>11</sup> bolts are driven to secure said stand to the plate *a* of the foot end A, each foot *k* resting upon chipping-surfaces or milling-surfaces



$a^{12}$   $a^{13}$  and each stand having a stud  $k^3$ , which projects through a hole  $a^{14}$  in said plate  $a$  and fits the same, and the foot of each stand resting upon a projection  $a^{15}$ , cast on said plate  $a$ .  
 5 The holes  $a^{14}$  and the studs  $k^3$  fit each other accurately, the holes being drilled and reamed out and said studs being accurately turned, so that, even if the foot  $k$  gets out of place or out of level, said studs will be concentric  
 10 with said holes and project at right angles from said plate  $a$  and hold the gears supported by them in their proper positions.

Another object of the above-described construction is to make more room for the gears  
 15  $E'$   $E^2$   $E^3$  in the box or hollow foot end and to allow of tightening up the bolts of the stands  $K'$   $K^2$   $K^3$  from the outer end or back of the foot end when the doors are removed; also, to allow of oiling the said gears through  
 20 holes in the studs  $k^3$  without opening said box. The head end and foot end, though not usually so called, are supports.

I claim as my invention—

1. In a ring-spinning machine, the combination with the inner foot end A having a vertically-extending opening, a bolt-hole above and below said opening, and bearing-ribs at the edges of the opening, of a compound stand consisting of the plate F having  
 25 the slots  $f^2$ , a longitudinal central opening and the bearing-ribs  $f^5$  at the sides of said opening, bolts extending through the slots  $f^2$  for adjustably securing the plate to the foot end, the curving arm  $f'$  having the curving  
 30 slot  $f^7$  and a bolt for adjustably securing the plate and arm together, a shaft extending through the curved slot  $f^7$  of the arm and adjustable therein, and a change-gear rotatable on said shaft.

40 2. A compound adjustable hanger for builder-levers of spinning-machines, comprising the combination with the foot end A having the slot  $a^7$ , the chipping-surfaces  $a^8$   $a^8$  and the ribs  $a^9$   $a^9$  disposed at each side of said  
 45 slot and adapted to receive between them the end of the builder-girth brace and to prevent the same from turning, and the builder-girth H to which the opposite end of the builder-girth brace is adapted to be adjustably secured, of  
 50 the builder-girth brace  $j^2$  adjustably secured to the foot end, between the ribs  $a^9$   $a^9$  and to

the builder-girth H, said builder-girth brace having vertical parallel ribs, the builder-hanger J having a shank fitting between the vertical ribs of the builder-girth brace  $j^2$  and  
 55 furnished with parallel vertical slots and a laterally-extending head at its lower portion furnished with the open slot  $j^5$ , the pivot-bolt  $j'$  laterally adjustable in said slot, and the builder I mounted to swing on said pivot. 60

3. The combination with the foot end A having the raised bearing-surfaces  $a^{12}$  and  $a^{13}$  on its inner surface, the bolt-holes  $a^{10}$  and  $a^{11}$ , the stud  $a^{15}$  between the lower ends of the bearing-surfaces and extending outward be-  
 65 yond the same, and the shaft-opening  $a^{14}$  in a line with the bolt-holes, of the gear-stand  $K^2$  consisting of a foot or plate  $k$  provided with bolt-holes  $k'$  and  $k^2$  and adapted to rest on the stud  $a^{15}$  when secured in position, and the  
 70 gear-stud  $k^3$  extending through the opening  $a^{14}$ , and bolts passing through the holes  $k'$  and  $k^2$  of the foot  $k$  and through the holes  $a^{10}$  and  $a^{11}$  in the foot end A, as and for the purpose described. 75

4. The combination with the foot end having the opening  $a^6$ , parallel pairs of chipping-surfaces above and below said opening, and a bolt-hole between each of said pairs of chipping-surfaces, of the pipe-box  $e^5$  having the  
 80 foot  $e^7$  furnished with raised borders, bolt-holes between the borders, a central bearing-sleeve one portion of which extends through the opening  $a^6$  in the foot end, and bolts for securing this pipe-box to the foot end. 85

5. The combination with the foot end having the central opening, the slots  $a^4$   $a^4$  and vertical ribs adjacent to said slots, and the stand  $c^8$  secured to the foot end by bolts passing through the slots  $a^4$   $a^4$ , of the supports  $A^2$ ,  
 90 the tables G having the flanges  $g'$  furnished with the vertical slots  $g^2$ , and bolts for securing these flanges to the supports  $A^2$ , as described.

In witness whereof I have signed this specification, in the presence of two attesting witnesses, this 13th day of October, A. D. 1892. 95

ALFRED D. CHANDLER.

Witnesses:

ALBERT M. MOORE,  
 KIRKLEY HYDE.