No. 768,132. PATENTED AUG. 23, 1904.

J. LUNDGREN.

BRAIDING MACHINE.

APPLICATION FILED JUNE 26, 1902. RENEWED JAN. 20, 1904.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.

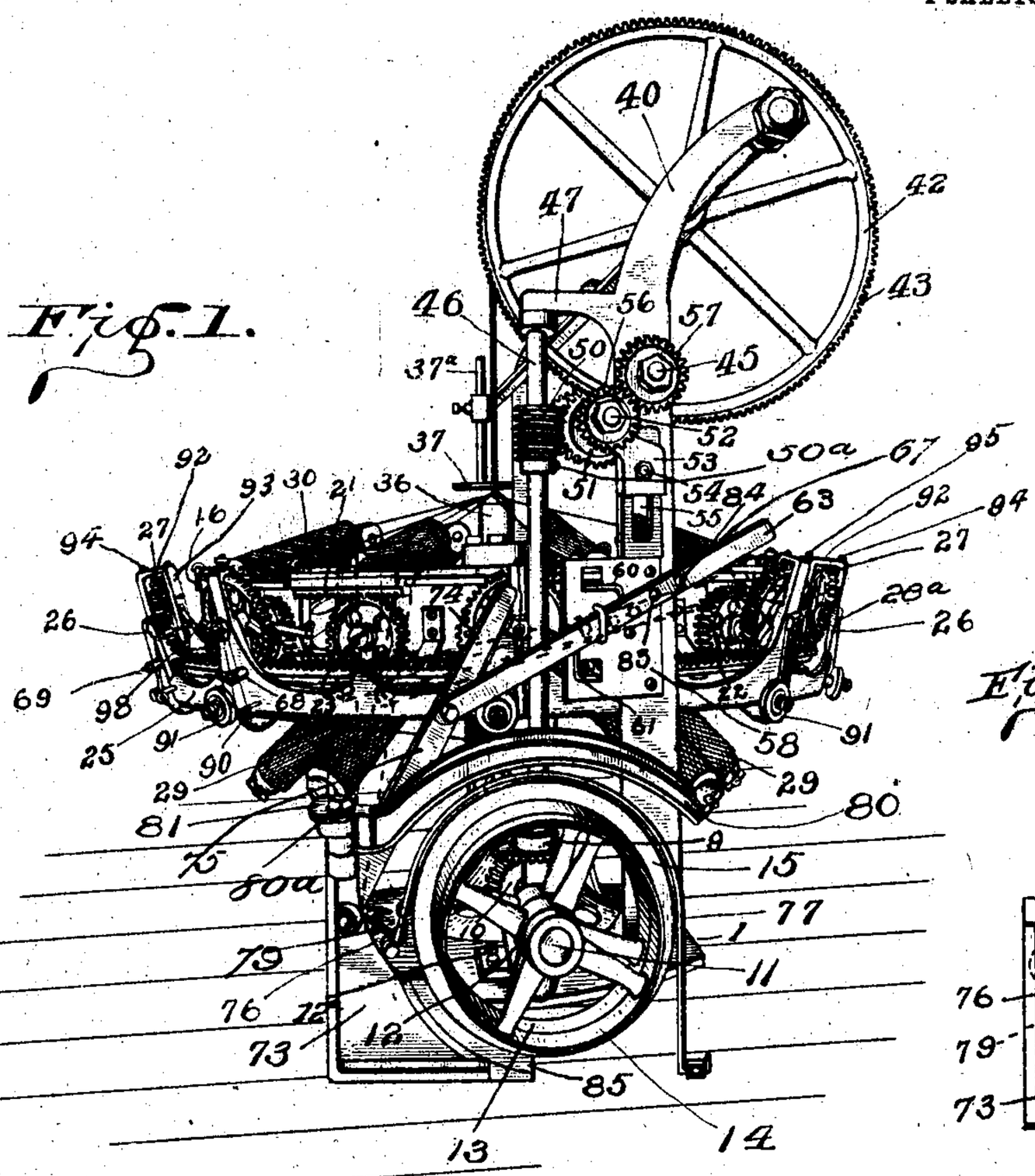


Fig. 8.

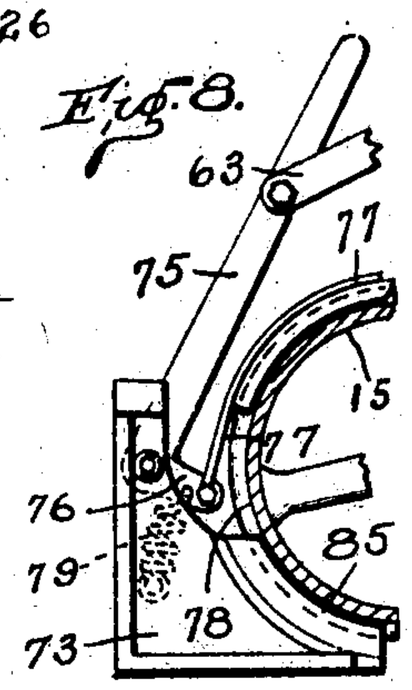
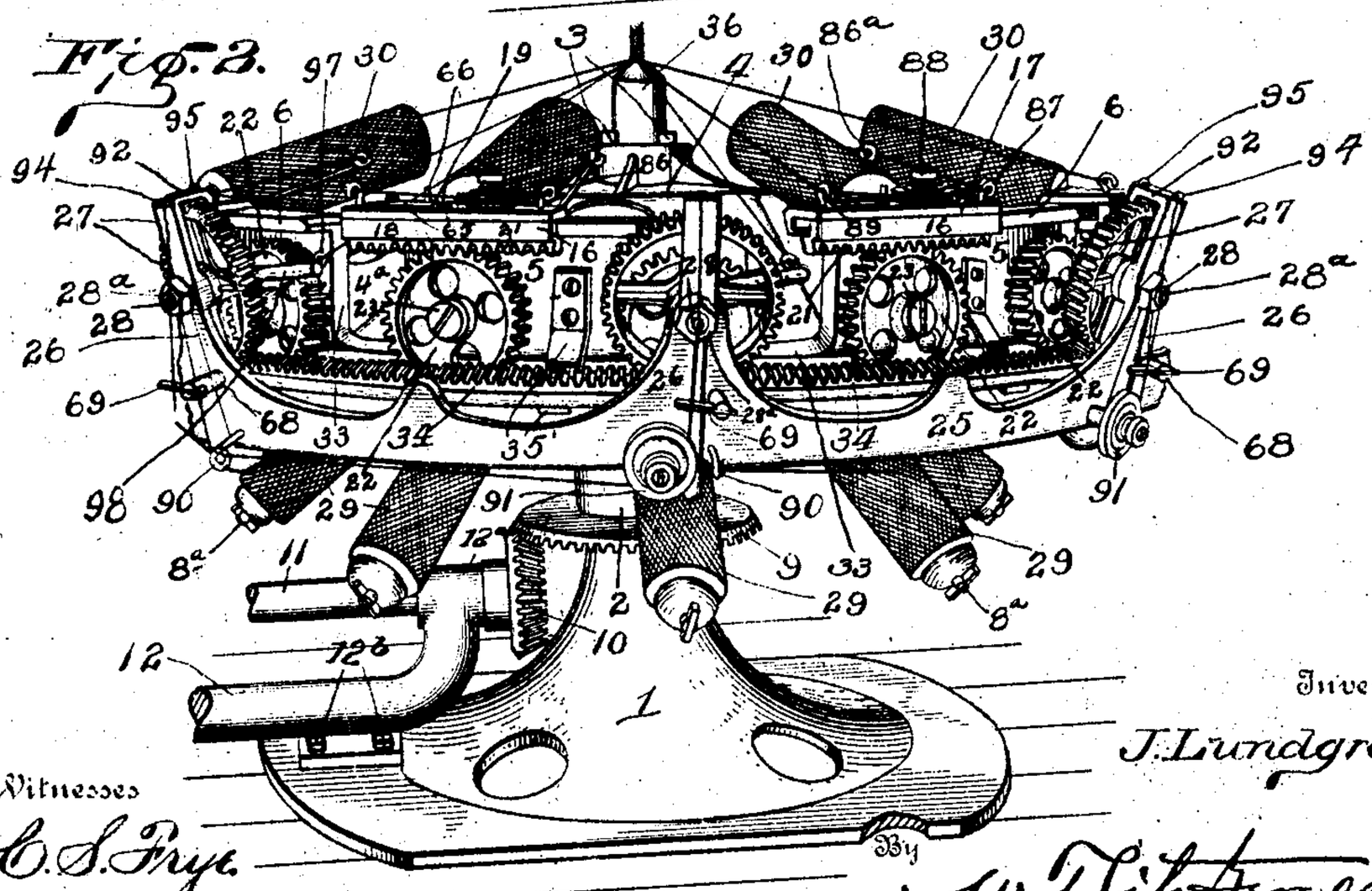


Fig. 2.



Witnesses

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NO MODEL. 4 SHEETS—SHEET 2.

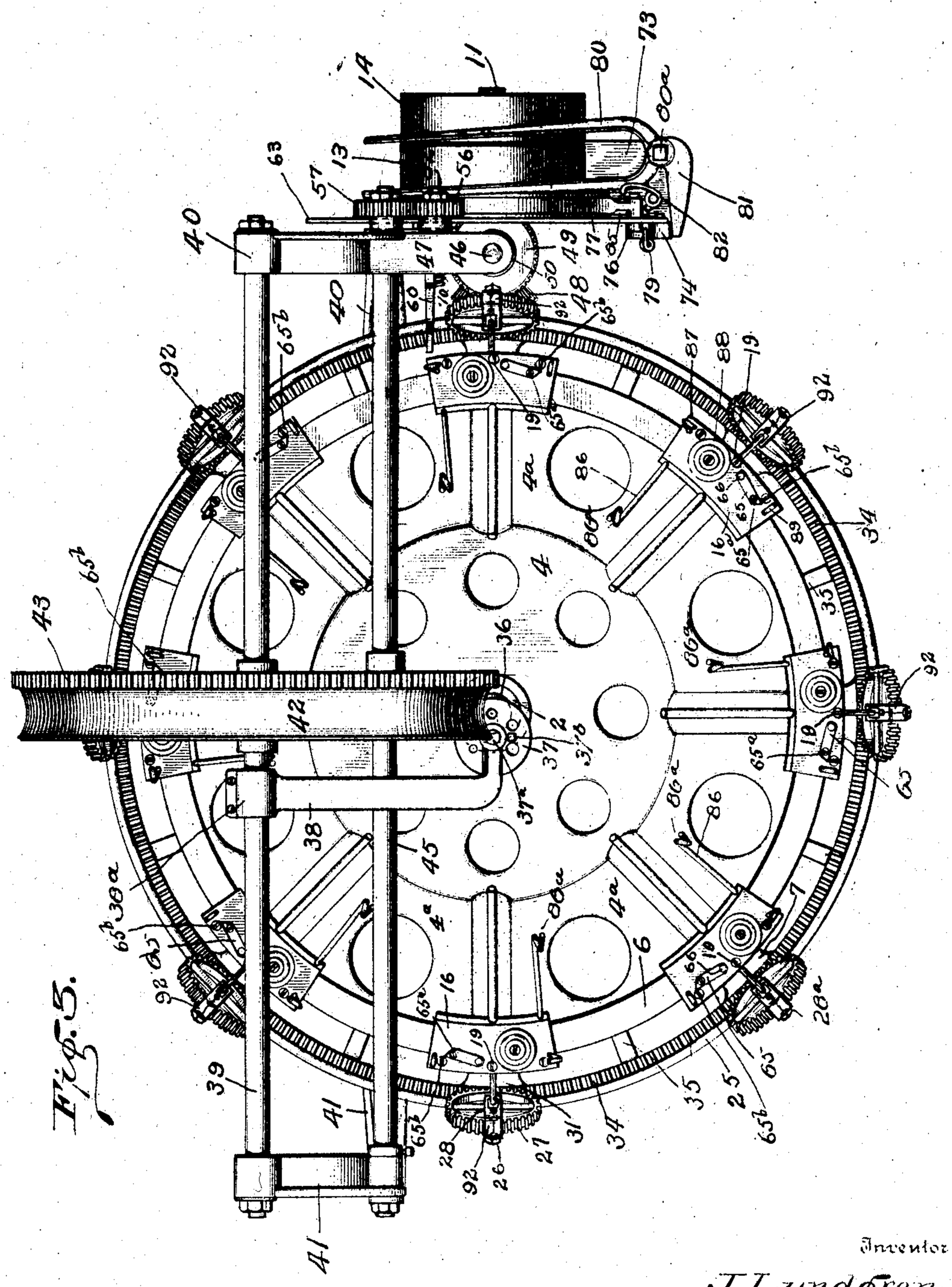

Fig. 5.

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NO MODEL. 4 SHEETS—SHEET 3.

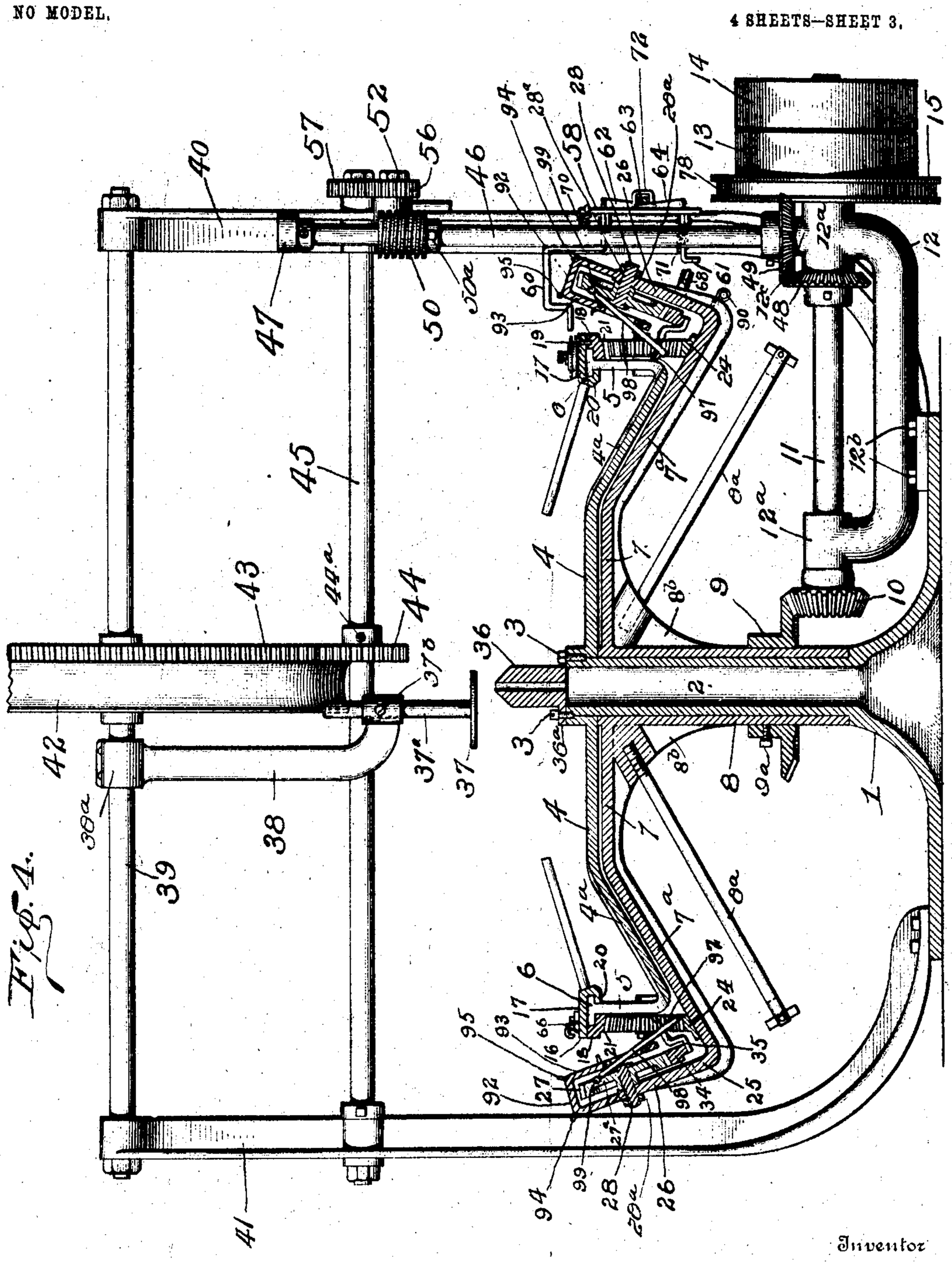

Fig. 4.

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NO MODEL. 4 SHEETS—SHEET 4.

Fig. 5.

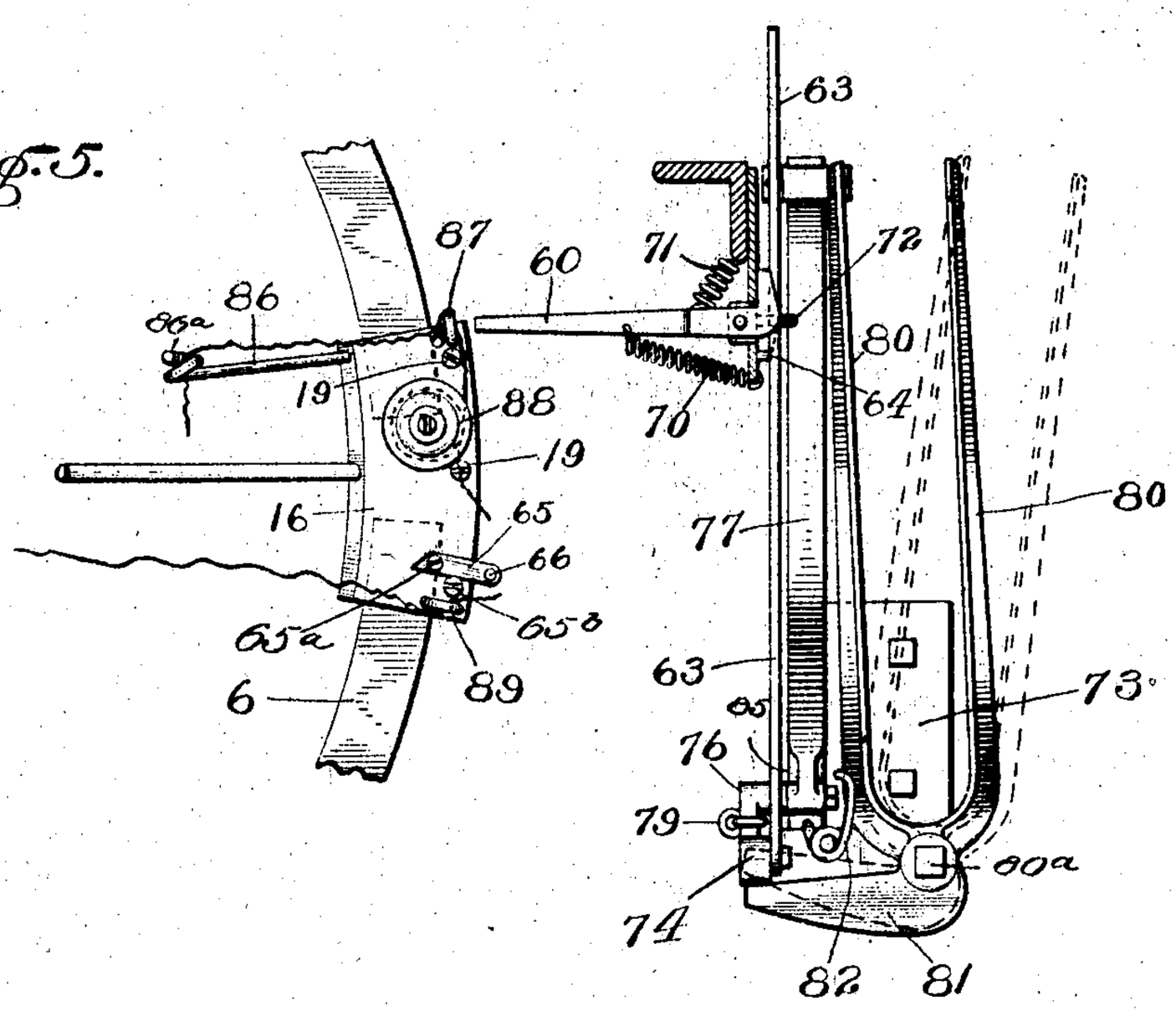


Fig. 6.

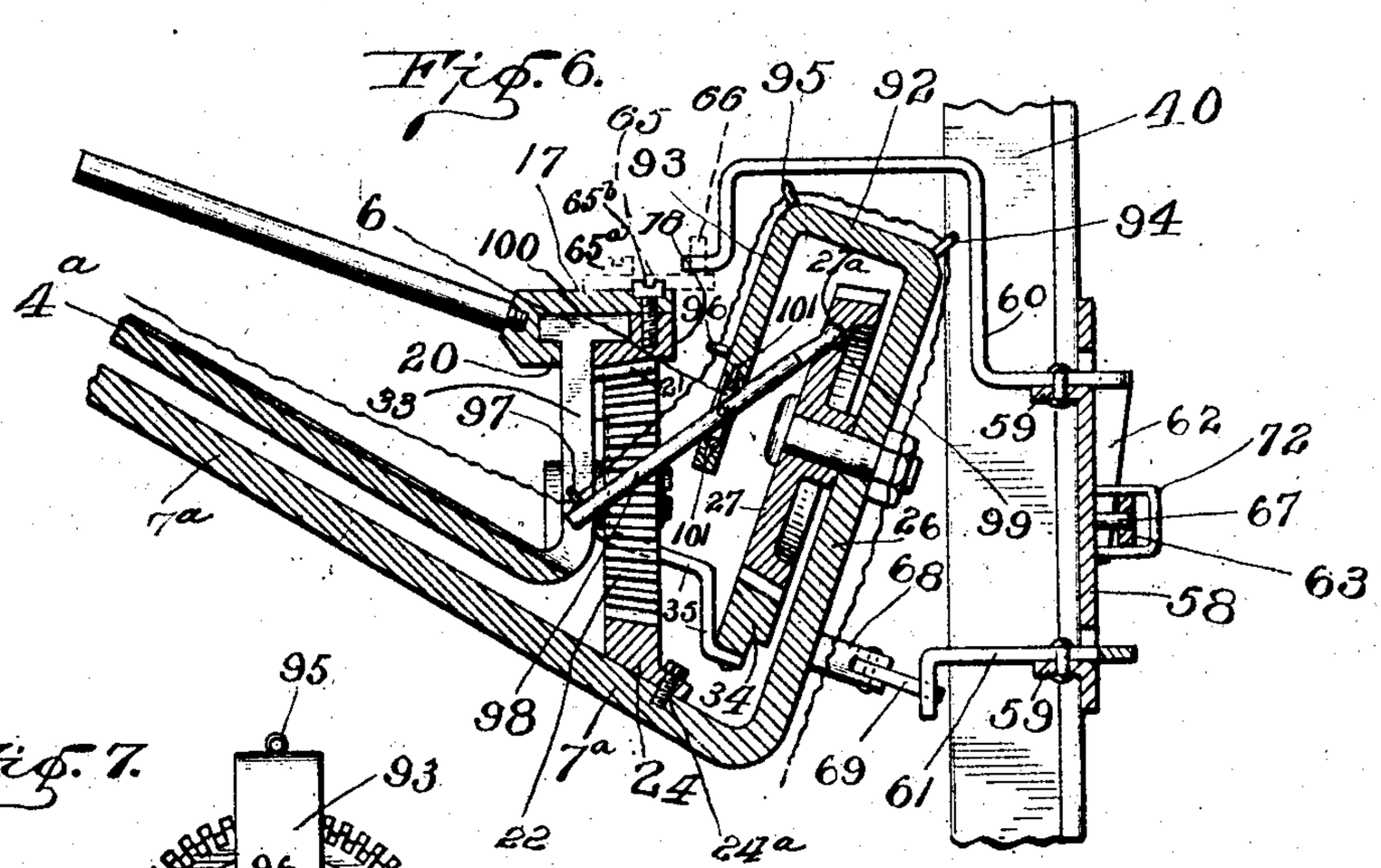
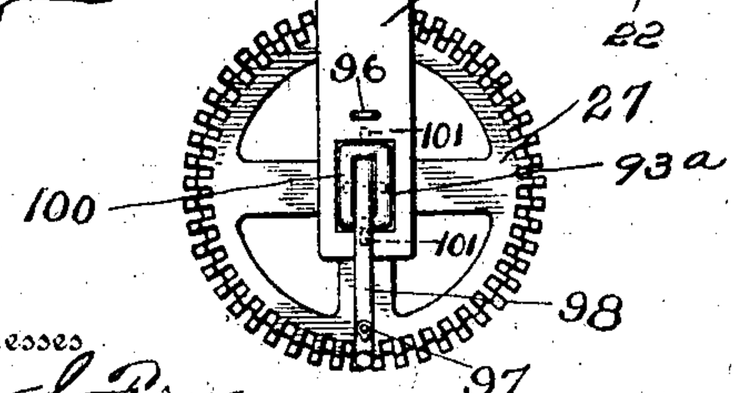


Fig. 7.



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No. 768,132. Patented August 23, 1904.

UNITED STATES PATENT OFFICE.

JACOB LUNDGREN, OF PHILADELPHIA, PENNSYLVANIA.

BRAIDING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 768,132, dated August 23, 1904.

Application filed June 26, 1902. Renewed January 20, 1904. Serial No. 189,925. (No model.)

To all whom it may concern:

Be it known that I, JACOB LUNDGREN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Braiding-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention, which relates to improvements in braiding-machines, set forth in the following description is designed to represent specific changes in and improvements upon the construction disclosed by me in United States Letters Patent No. 695,746, granted to me on March 18, 1902; and one object, among others, is to dispose the thread from the lower bobbins into operative relationship with the threads from the upper bobbins without taking the lower thread through an axial bore in the thread-directing member, (designated by the reference-numeral 22 in the said Letters Patent.)

Another object of my invention is to present a simplified design for the various coöperating parts of my braiding-machine, and especially for the bobbin-carrying tables, whereby a more perfect grouping of all the parts into a compact or limited space is shown to be possible.

Other objects and advantages of this invention will be hereinafter made clearly apparent, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of my improved braiding-machine in its operative position looking at the right-hand side thereof. Fig. 2 is an enlarged detail perspective view of the central portion of the same looking at the back of the machine. Fig. 3 is a top plan view of the machine. Fig. 4 is a central vertical section through the machine looking inward toward the back thereof. Fig. 5 is an enlarged detailed top or plan view of the belt-shifter, the brake, and the upper-bobbin carrier adjacent thereto. Fig. 6 is an enlarged detail vertical section through one side of the machine, showing the thread-directing mechanism. Fig. 7 is a detail elevation of a portion of the said mechanism. Fig. 8 is a detail side elevation of the brake device.

While I have found the avoidance of a reciprocating motion or movement of the thread-directing member heretofore commonly employed to operate the thread from the lower bobbins to be eminently practical as disclosed in my said Letters Patent, I shall present in the description which follows certain modifications in the construction of minor parts designed to coöperate with my rotating thread-directing member above referred to which will in certain instances more reliably accomplish the desired result of plaiting or incorporating the threads from both sets of bobbins at the proper braiding-point and which will insure the most harmonious coöperation of all the elements of my braiding-machine, thereby removing undue strain from the threads at the braiding-point and accomplishing other desirable results hereinafter made more clearly apparent.

It will be seen that I have also provided a very simple though reliably-efficient mechanism for stopping the operation of my braiding-machine should a thread from any of the bobbins become broken, and, while I am aware that various appliances with such object in view have heretofore been provided, I desire to call particular attention to the special means hereinafter described, and disclosed in the accompanying drawings.

Referring now to the drawings, 1 is the base member or support, terminating in the upwardly-extending reduced tubular section 2. Rigidly secured to the upper end of the tubular section 2 by means of screws 3 or otherwise is the stationary body portion or table 4, having the downwardly-inclined portion 4^a, the said table being circular in form, the outer edge thereof provided with the vertical T-shaped circumferential flange-segments 5, providing a segmental track or guideway 6 for certain mechanism to be hereinafter referred to.

Disposed immediately below the table 4 is the rotating member or spider 7, provided with downwardly-inclined outer portion 7^a and ribbed tubular inner portion 8, which is sleeved and designed to fit snugly on the tubular sec-

tion 2 and to be supported on a shoulder on the base member, the said tubular section 2 serving as a post on which the spider 7 is designed to freely rotate between said shoulder and the surmounting table 4.

8ª represents the lower-bobbin spindles, rigidly secured to the webs 8ᵇ of the inner portion 8 of the spider 7.

Fastened rigidly by a screw 9ª to the downwardly-extending portion 8 is a bevel-gear 9, meshed by the driving bevel-gear 10, which in turn is rigidly secured to the driving-shaft 11, mounted in bearings 12ª, formed on a lower bracket 12, secured by bolts 12ᵇ to the base member 1. Carried by the outer or free end of the driving-shaft 11 is a belt-wheel 13 and an idler 14. Securely attached to or formed integral with the belt-wheel 13 is a channeled brake-wheel 15, the object of which will be hereinafter more fully stated. Mounted upon the segmental track 6 of the flange-segments 5 are a series of upper-bobbin carriers 16, each of the said carriers being made in two parts 17 and 18, respectively, the said parts being held securely together by screws 19 or the like. The upper part 17 is L-shaped in cross-section, the short parallel portion or lip 20 being adapted to extend beneath one side of the segmental track 6 and the lower part 18 being adapted to extend beneath the opposite side of the segmental track 6, thus holding the carriers 16 securely in place and at the same time providing a means whereby the carriers may be guided upon the segmental track 6.

It will be understood that the number of bobbin-carriers employed varies and is regulated by the size of the machine in use, a large machine requiring more bobbin-carriers than a small machine.

In order that the upper-bobbin carriers 16 may be positively driven around on the segmental track 6, I provide the lower parts 18 with racks 21, which are meshed by the gears 22, rotatably mounted upon studs 23, secured to the vertical flange-segments 5. The gears 22 are so arranged with respect to the bobbin-carriers 16 that at least one of the said gears 22 will always be in mesh with each of the racks 21—that is to say, before a rack 21 has passed off from one of the gears 22 it will be engaged by the next gear 22 in its line of travel, thus keeping the bobbin-carriers 16 moving uniformly. The gears 22 are designed to be meshed by the annular cogway 24, which is carried by the outer portion 7ª of the spider 7 and is secured thereto by bolts 24ª, (see Fig. 6,) so that as the spider is revolved the cogway 24 imparts rotation to the gears 22. It is preferable to construct the cogway 24 in sections; but I do not desire to be confined to this particular construction, as any preferred method of construction may be adopted.

The outer edge of the inclined portion 7ª of the spider 7 is provided with an upwardly-extending circumferential flange 25, certain portions of which are formed with standards or brackets 26, to which are rotatably mounted the thread-directing gears 27 by means of studs 28, secured thereto by nuts 28ª.

To carry the thread from the lower series of bobbins 29 alternately above and below the threads from the upper bobbins 30 and cause the said thread to be interwoven with respect to each other, I have extended the standard 26 for the said gear 27 upwardly to provide the inwardly-directed branch 92, having the depending terminal 93 disposed adjacent to the inner face of the said gear 27 and designed to afford means for carrying the thread over the gear 27. It will be seen that the branch 92 and terminal 93 are provided at proper intervals with thread-guides 94, 95, and 96, through which the thread from the lower bobbins is directed safely into position to be delivered through the guide 97 to the braiding-point, and in order that said thread may be properly manipulated or directed under one carrier 16 of the upper bobbins 30 and over the next I provide the pivoted lever 98, which carries at its free end the said thread-guide 97. The fulcrum of the lever 98 is disposed near the middle thereof, as by providing a slot 93ª in the lower end of the terminal 93 and so pivotally mounting the said lever 98 therein that the headed terminal 99 thereof may be seated in a suitable recess 27ª, formed in the gear 27 near the outer edge thereof, thereby constituting a ball-and-socket joint. It is obvious that the free end of the lever 98 will be so moved by the rotation of the gear 27 that the thread-guide 97, carried by the said free end of the lever 98, will describe a trochoidal path, successively elevating and depressing the thread, so that the same will be safely disposed over one upper carrier 16 and under the next as the same moves swiftly upon its segmental track 6. It will be understood that the requisite pivoted connection or relationship between the lever 98 and the terminal 93 may be provided by pivoting the said lever 98 to a gimbal-frame or carrying member 100, which is provided at its upper and lower ends with the journals or lugs 101, adapted to take into suitable apertures provided in a contiguous part of the slot 93ª, formed in the terminal 93, as will be obvious. As the gear 27 is moved bodily on its annular course the rotation of the said gear 27 will so actuate the lever 98 that the thread delivered by the thread-guide 97 will be moved in a trochoidal path, the openings 33 in the T-shaped flange 5 affording ample room in which to safely direct said thread downwardly in time to be passed over by the next succeeding upper-bobbin carrier.

Motion is imparted to the gears 27 by means of the annular cogway 34, which is held in position by means of a series of brackets

which are in turn rigidly secured to the flange 5, thus holding the cogway 34 rigid with respect to the table 4. To insure that the braiding point or angle may not move below the conical surface passing through the axes of the bobbins 30, I secure upon the upper end of the tubular section 2 a conically-pointed core-guide 36 by means of a lug or lip 36^a, formed thereon. The core-guide 36 has a core-hole through it, and its upper end is centrally disposed with respect to the several upper bobbins 30.

Disposed at a suitable distance above the core-guide 36 is a braid-guide 37, the said braid-guide being adjustably secured by a set-screw 37^b, bearing against the slidable stem 37^a of the braid-guide in the end of an arm 38, which is in turn adjustably secured upon a rod 39 by a clamp 38^a. The rod 39 is mounted in inner and outer main brackets 40 and 41 at either side of the machine proper. The braid-guide 37 is provided with various-sized holes to accommodate the different sizes of braid, and its stem can be rotated so as to bring the desired hole over the hole in the core-guide 36.

Mounted upon the rod 39 and adapted to be rotated freely thereon is a grooved pulley 42, one edge of which is provided with teeth 43. The grooved pulley 42 is designed to serve as a take-up or tension for the finished braid and is caused to rotate by the inner pinion 44, the teeth of which mesh with the teeth 43 upon the pulley 42. The pinion 44 is rigidly secured upon an upper shaft 45, journaled in the main brackets 40 and 41, by means of a set-screw 44^a or otherwise, and is adapted to rotate with said upper shaft 45.

To impart motion to the upper shaft 45, I provide a vertically-disposed worm-shaft 46, one end of which finds a bearing in the arm 47, projecting laterally from the main bracket 40, the opposite end being seated in a projection 12^c upon the upper side of the lower bracket 12. The said worm-shaft 46 is driven by the bevel-gear 48 on the driving-shaft 11 and the bevel-gear 49 on the vertical worm-shaft 46. Adjustably secured by set-screw 50^a upon the worm-shaft 46 is a worm 50, which meshes with the worm-gear 51, keyed or otherwise rigidly secured to one end of a short shaft 52, carried by an adjustable bracket or bearing 53, secured to the main bracket 40 by means of a bolt 54, the slot 55, into which the bolt extends, being elongated for a purpose hereinafter set forth. On the opposite end of the shaft 52 from that occupied by the worm-gear 51 I dispose a pinion 56, which meshes a pinion 57, mounted upon the shaft 45, the said pinions 56 and 57 being changeable, so that when it is desired to regulate the speed of the pulley 42 pinions of different sizes are placed upon the shafts 45 and 52, thus varying the speed of said pulley.

By providing the elongated slot 55 in the bracket 40 the bearing 53, carrying the pinion 56 and the worm-gear 51, may be adjusted up or down to compensate for the different-sized pinions that may be used, thus avoiding the necessity of using intermediate pinions in order to provide the desired speed. It will be obvious that when the bearing 53 is raised or lowered the worm 50 may be correspondingly raised or lowered upon the worm-shaft 46.

It being very desirable and important that the machine shall be quickly stopped when one of the threads becomes broken, I have provided for the accomplishment of this result a combined belt-shifting and brake mechanism, which I will now describe. Securely attached to the main bracket 40 by means of screws or otherwise is a lever-plate 58, having certain portions thereof partly cut therefrom and turned inward to provide supports 59 for upper and lower trip-levers 60 and 61, respectively. A portion of the upper lever 60 is bent downwardly to provide a finger 62, which is slightly tapered, so as to pass freely between the lever-plate 58 and a locking-bar 63, which is supported on a pin 67. The lower trip-lever 61 is bent upwardly to provide a finger 64, which is also preferably slightly tapered to fit between the said plate 58 and the locking-bar 63. Pivotally mounted upon each of the carriers 16 by means of screws 65^a are tripping devices 65, limited in their movement by means of the screws 65^b or the like. The tripping devices 65 carry pins 66, upon which the threads bear and throw the tripping devices inward until their inner ends come in contact with the screws 65^b or the like, which act as stops. When one of the threads from the upper bobbins becomes broken, its trip will be thrown out by centrifugal force and bear against its screw 65^b and bring its pin 66 into the path of the upper trip-lever 60 and striking the latter will cause the finger 62 to swing outward and push the locking-bar 63 off its supporting-pin 67 and release it, so as to permit the combined belt-shifters and brake mechanism to operate.

In order to detect or locate a break in the threads from the lower bobbins, I have provided slotted studs 68, mounted at suitable points around the periphery of the spider 7, the said studs carrying tripping-pawls 69, pivoted thereto, on which the lower threads bear to hold them inward, but adapted to swing outward by centrifugal force when the thread bearing thereon is broken, the released pawl moving out in the path of and engaging with the lever 61, thus causing the finger 64 of the latter to swing outward and disengage the bar 63 from the pin 67, the bar 63 being sufficiently yielding to thus move on its pivoted connection hereinafter described. After the respective tripping devices have passed beyond the tripping-levers 60 and 61 the said levers are restored to their normal positions by suitable springs 70 and 71, respectively. The locking-bar is held in a position relative to the

fingers of the tripping-levers 60 and 61 and the pin 67 by means of a retaining-staple 72 or the like, in which it is free to move outwardly and slide when released. Pivotally attached to one side of a suitable standard or base member 73 is a bell-crank lever 74, to the long arm 75 of which is pivotally secured, about midway of the length thereof, one end of the locking-bar 63, the short arm 76 of the bell-crank lever 74 carrying one end of a friction-brake 77, the said friction-brake being secured to any suitable stationary object at its other end, so that when the locking-bar 63 is disengaged from the pin 67, so as to slide in the staple 72 or the like, the friction-brake 77 will be drawn down into the channel 78 of the brake-wheel 15 by means of a spring 79, secured to the short arm 76 of the bell-crank lever, thus quickly checking the speed of the machine, inasmuch as the belt has at the same time been shifted from the driving-pulley 13 to the idler 14.

Mounted upon the upper portion of the standard 73 by a pivot-bolt 80ª is a bifurcated belt-shifter 80, having a laterally-extending arm 81 arranged so as to be engaged by the long arm 75 of the bell-crank lever 74. When the locking-bar has been disengaged from the pin 67 and the bell-crank lever 74 released and its long arm 75 has been thrown forward, a spring 82, secured to the standard 73, is released from compression and forces the belt-shifter outwardly, thus transferring the belt from the driving-pulley 13 to the idler 14 and causing the machine to stop running. The belt-shifter 80 is held in the position shown by dotted lines in Fig. 5 by the spring 82 until the bell-crank lever 74 is drawn back to its upright position, the arm 81 being in the path of the said bell-crank lever, causing the belt-shifter to assume the position shown in full lines in Fig. 5, thus transferring the belt from the idler 14 to the driving-pulley 13 and again starting the machine. It will be seen that as the belt is shifted from the pulley to the idler, or vice versa, the brake is applied or released.

It very frequently becomes desirable to release the friction-brake 77, so that the machine may be manually operated for the purpose of adjustment, and it is therefore necessary to avoid shifting the belt from the idler to the driving-pulley, and to this end I provide two holes or seats 83 and 84 in the locking-bar 63, so that should it be desirable to release the friction-brake without shifting the belt the bell-crank lever 74 is drawn back until the inner hole or seat 83 registers with and receives the pin 67, the arm 81 of the belt-shifter 80 only just coming in contact with the said bell-crank lever 74 at this position. It will thus be seen that the belt-shifter and friction-brake may be operated independently of each other.

When it is desired to throw the belt into operative position and also release the friction-brake, the bell-crank lever 74 is moved on until the pin 67 registers with the hole 84. To give a firmer grip upon the channeled pulley 15, I provide a shoe 85 upon the standard 73 in juxtaposition to the under side of the channel 78 of the pulley 15, so that when the friction-brake 77 is applied the pulley 15 is caused to slightly yield and come in contact with and bear against the shoe 85 by the action of the bell-crank lever, thus providing additional friction-surface, and inasmuch as the pulley 15 is practically surrounded by the gripping members the machine is quickly stopped when the friction-brake is applied.

In operation the threads from the upper bobbins 30 are passed through the inner eyes 86ª of the arms 86, which are secured to the carriers 16, thence outwardly to the eyes 87, also secured to the carriers 16, thence around the tensions 88, mounted on the carriers 16, passing thence to the outer side of the pins 66 on the upper tripping devices 65 on the carriers 16 through the eyes 89, also on the carriers 16, and then to the braiding-point, where the threads are incorporated or plaited around the core, which extends up through the tubular guide 36. The threads from the lower bobbins 29 are first passed through eyes 90, secured upon the periphery of the spider 7, thence around the tensions 91, also secured to the spider 7, passing to the outside of the pivoted pawls 69, to the eyes 94, 95, and 96, over the branch 92 and terminal 93 to the guides 97 on the lever 98 of the thread-directing gear 27.

It will be clearly obvious that by having the threads so disposed with respect to the tripping devices 65 and the pivoted pawls 69 the threads traveling thereon will of their own tension hold the tripping devices 65 and pivoted pawls 69 inward, so as not to come in contact with or engage the trip-levers 60 and 61, respectively, until the threads are broken, when they will instantly fly or be thrown outward by centrifugal force into the path of and operate the said trip-levers.

What I claim as new, and desire to secure by Letters Patent, is—

1. A braiding-machine comprising a support having a tubular section, a core-guide secured to the tubular section, and a rotatable and vertically-adjustable braid-guide located over the core-guide, as set forth.

2. A braiding-machine comprising a support having a tubular section, a core-guide secured to the tubular section and a braid-guide having various-sized holes and located over the core-guide as set forth.

3. A braiding-machine comprising a support having a tubular section, a table having T-shaped circumferential flange-segments providing a segmental track, and an upper-bobbin carrier consisting of an upper part, L-shaped in cross-section, and having a short lip extending beneath the track on one side

thereof, a lower part having a rack and extending beneath the track on the outer side thereof, means for securing the parts of the carrier together, a stud secured to a flange-segment, a gear mounted on the stud and meshing with the rack and means for rotating the gear, as set forth.

4. A braiding-machine comprising a spider having a circumferential flange, a thread-directing gear mounted on the flange, a lever, having a thread-guide, pivoted in the thread-directing gear and fulcrumed at the inner side thereof, and means for carrying the thread over the thread-directing gear to the thread-guide of the lever, as set forth.

5. In braiding-machines, the combination of an upper and lower set of bobbins and suitable carriers therefor, the carriers for the lower bobbins having a plurality of thread-directing gears; means to rotate said gears; additional means to pass a thread around its respective directing-gear to the inner side thereof, and a lever in pivotal engagement with the inner face of said gear adapted at its free end to engage said thread and pass it under and over each alternate upper bobbin, substantially as and for the purpose set forth.

6. An upper-bobbin carrier comprising an upper part L-shaped in cross-section, having a short lip parallel with the body thereof, a lower part having a rack, means for securing the parts together, an arm having an inner eye and secured to the carrier, outer eyes and a tension intermediate of the outer eyes, as set forth.

7. A braiding-machine comprising a spider having a circumferential flange provided with a standard formed with a branch having thread-eyes, and a terminal having a thread-eye, a thread-directing gear mounted on the standard within the branch and terminal, and a lever having a thread-eye and fulcrumed in the terminal and pivoted in the thread-directing gear as set forth.

8. A braiding-machine comprising a spider having a circumferential flange provided with a standard formed with a branch having thread-eyes and a terminal having a thread-eye, a thread-directing gear mounted on the standard within the branch and terminal, the gimbal-frame mounted in the terminal, and a lever having a thread-eye and fulcrumed in the gimbal-frame and having ball-and-socket connection with the thread-directing gear, as set forth.

9. A braiding-machine comprising a spider having a circumferential flange formed with a standard, a thread-directing gear mounted on the standard, a lower-bobbin carrier, a thread-eye on the flange, a tension on the flange adjacent to the thread-eye, a slotted stud on the standard above the tension, and a tripping-pawl pivoted to the stud held in normal position by the thread extending from the tension to the thread-directing gear and adapted to be thrown out by centrifugal force when the thread is broken, as set forth.

10. A braiding-machine comprising a rotatable spider, an upper-bobbin carrier provided with a tripping device pivoted thereto and thrown out by centrifugal force and having a thread-pin, a bracket, a lever-plate having a retaining-staple and a pin, a trip-lever with which the tripping device is adapted to engage, pivoted to the lever-plate and having a finger adjacent to the retaining-staple, a locking-bar supported on the pin of the lever-plate within the retaining-staple against the finger of the trip-lever, a bell-crank lever with which the locking-bar is connected, means for rotating the spider, having a driving-shaft provided with a brake-wheel, and a brake mechanism connected with the bell-crank lever as set forth.

11. A braiding-machine comprising a rotatable spider, an upper-bobbin carrier provided with a tripping device pivoted thereto and thrown out by centrifugal force and having a thread-pin, a bracket, a lever-plate having a retaining-staple and a pin, a trip-lever with which the tripping device is adapted to engage, pivoted to the lever-plate and having a finger adjacent to the retaining-staple, a locking-bar supported on the pin of the lever-plate within the retaining-staple against the finger of the trip-lever, a bell-crank lever with which the locking-bar is connected, means for rotating the spider, having a driving-shaft provided with fixed and loose pulleys and a belt-shifter controlled by the bell-crank lever, as set forth.

12. A braiding-machine comprising a rotatable spider, an upper-bobbin carrier provided with a tripping device pivoted thereto and thrown out by centrifugal force and having a thread-pin; a bracket, a lever-plate having a retaining-staple and a pin, a trip-lever with which the tripping device is adapted to engage, pivoted to the lever-plate and having a finger adjacent to the retaining-staple, a locking-bar supported on the pin of the lever-plate within the retaining-staple against the finger of the trip-lever, a bell-crank lever with which the locking-bar is connected, means for rotating the spider having a driving-shaft provided with a brake-wheel and fixed and loose pulleys and a brake mechanism connected with the bell-crank lever and a belt-shifter controlled by the bell-crank lever, as set forth.

13. A braiding-machine comprising a rotatable spider, an upper-bobbin carrier provided with a tripping device pivoted thereto and thrown out by centrifugal force and having a thread-pin; a bracket, a lever-plate having a retaining-staple and a pin, a trip-lever with which the tripping device is adapted to engage pivoted to the lever-plate and having a finger adjacent to the retaining-staple, a locking-bar supported on the pin of

the lever-plate within the retaining-staple against the finger of the trip-lever, a bell-crank lever having a long arm pivoted to the locking-bar, and a short arm, means for rotating the spider having a driving-shaft provided with a brake-wheel, and a friction-brake secured to a fixed part of the machine and to the short arm of the bell-crank lever, as set forth.

14. A braiding-machine comprising a rotatable spider, an upper-bobbin carrier provided with a tripping device pivoted thereto and thrown out by centrifugal force and having a thread-pin; a bracket, a lever-plate having a retaining-staple and a pin, a trip-lever with which the tripping device is adapted to engage, pivoted to the lever-plate, and having a finger adjacent to the retaining-staple, a locking-bar supported on the pin of the lever-plate within the retaining-staple against the finger of the trip-lever, a bell-crank lever having a long arm pivoted to the locking-bar and a short arm, means for rotating the spider, having a driving-shaft provided with a brake-wheel, and a brake-shoe adjacent to the brake-wheel, as set forth.

15. A braiding-machine comprising a rotatable spider, an upper-bobbin carrier provided with a tripping device pivoted thereto and thrown out by centrifugal force and having a thread-pin; a bracket, a lever-plate having a retaining-staple and a pin, a trip-lever, with which the tripping device is adapted to engage, pivoted to the lever-plate, and having a finger adjacent to the retaining-staple, a locking-bar supported on the pin of the lever-plate within the retaining-staple against the finger of the trip-lever, a bell-crank lever having a long arm pivoted to the locking-bar, means for rotating the spider, having a driving-shaft provided with a brake-wheel, a friction-brake secured to a fixed part of the machine and to the short arm of the bell-crank lever, and a brake-shoe adjacent to the brake-wheel, as set forth.

16. A braiding-machine comprising a rotatable spider, an upper-bobbin carrier provided with a tripping device pivoted thereto and thrown out by centrifugal force, and having a thread-pin; a bracket, a lever-plate having a retaining-staple and a pin, a trip-lever with which the tripping device is adapted to engage, pivoted to the lever-plate and having a finger adjacent to the retaining-staple a locking-bar supported on the pin of the lever-plate within the retaining-staple against the finger of the trip-lever, a bell-crank lever pivoted to the locking-bar, means for rotating the spider, having a driving-shaft provided with fixed and loose pulleys and a pivoted belt-shifter having an arm projecting in the path of the bell-crank lever as set forth.

17. A braiding-machine comprising a rotatable spider having a tripping-pawl, pivoted thereto and thrown out by centrifugal force, a bracket, a lever-plate having a retaining-staple and a pin, a trip-lever with which the tripping-pawl is adapted to engage, pivoted to the lever-plate and having a finger adjacent to the retaining-staple, a locking-bar supported on the pin of the lever-plate within the retaining-staple against the finger of the trip-lever, a bell-crank lever, pivoted to the locking-bar, means for rotating the spider and means connected with the said means for stopping the operation thereof, as set forth.

18. A braiding-machine comprising a bracket, a lever-plate having a retaining-staple and a pin, a trip-lever with which a tripping device is adapted to engage, pivoted to the lever-plate and having a finger adjacent to the retaining-staple, an adjustable locking-bar, having a series of pin-holes, supported on the pin of the lever-plate within the retaining-staple and against the finger of the trip-lever, and a bell-crank lever with which the locking-bar is connected and whereby the movement of the bell-crank lever is controlled, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JACOB LUNDGREN.

Witnesses:
J. DANIEL EBY,
WALTER PINCUS.