

910,742.

C. THIBODEAU.
CIRCULAR LOOM.
APPLICATION FILED SEPT. 25, 1907.

Patented Jan. 26, 1909.
6 SHEETS—SHEET 1.

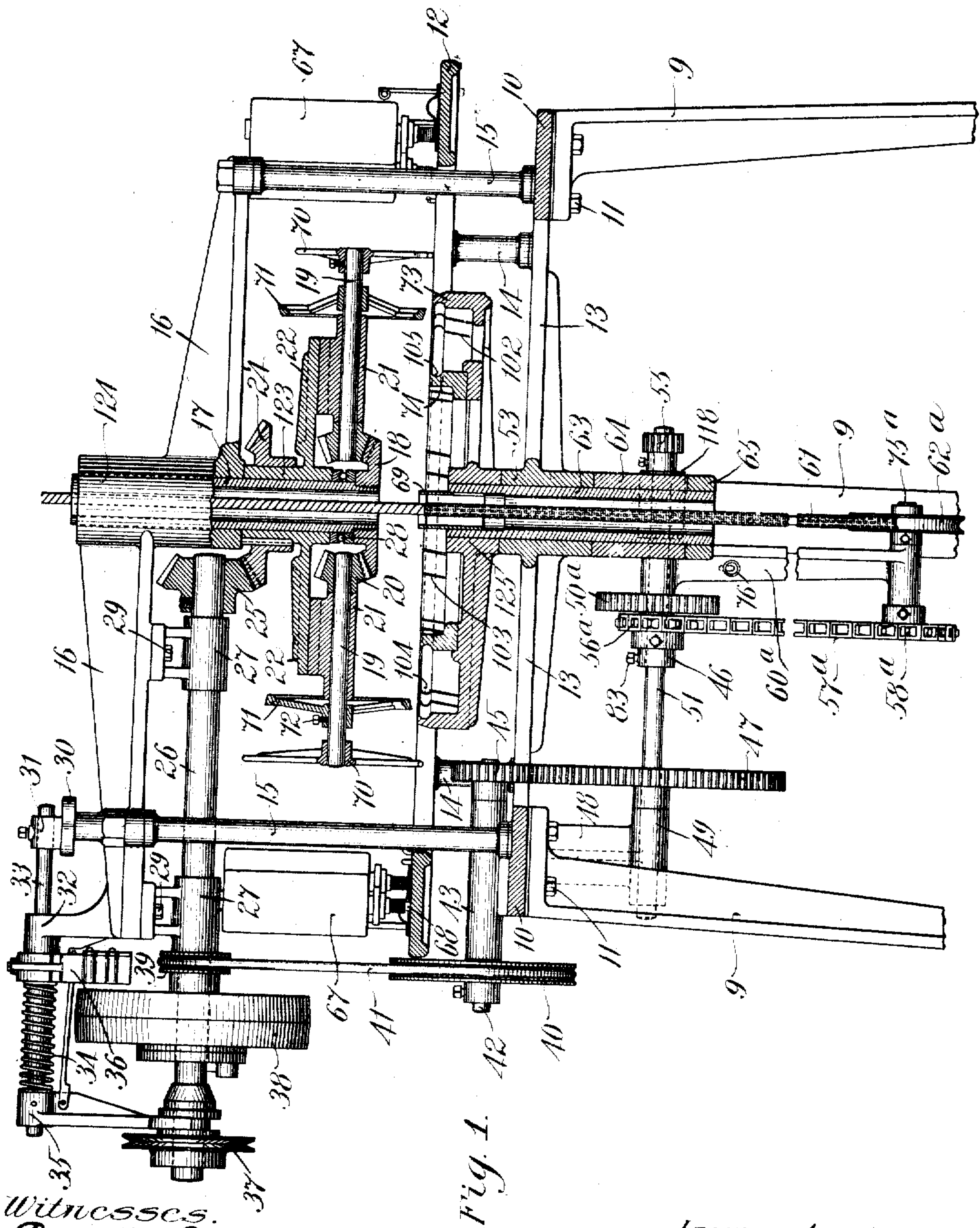


Fig. 1.

Witnesses.
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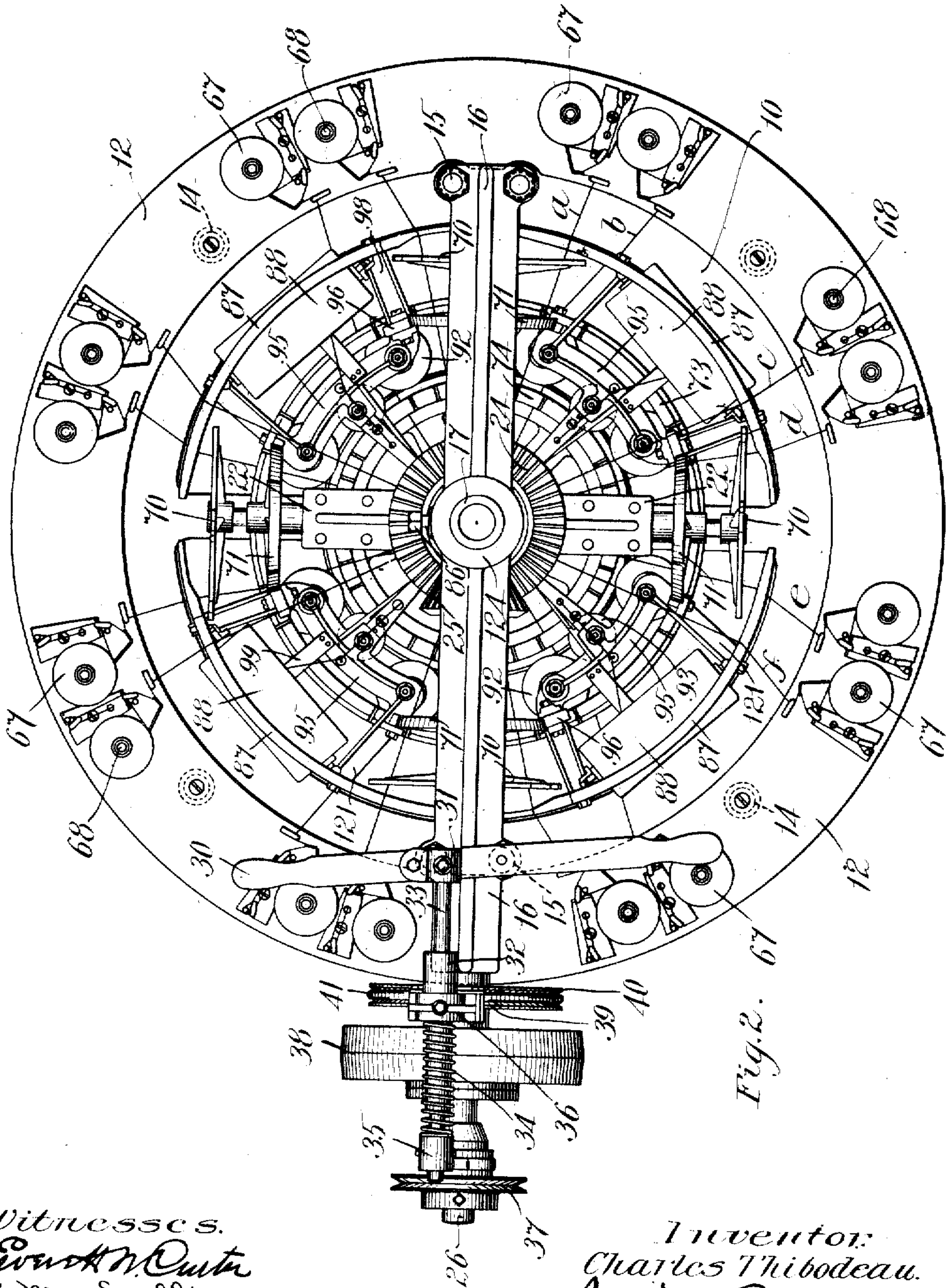


Fig. 2. 67

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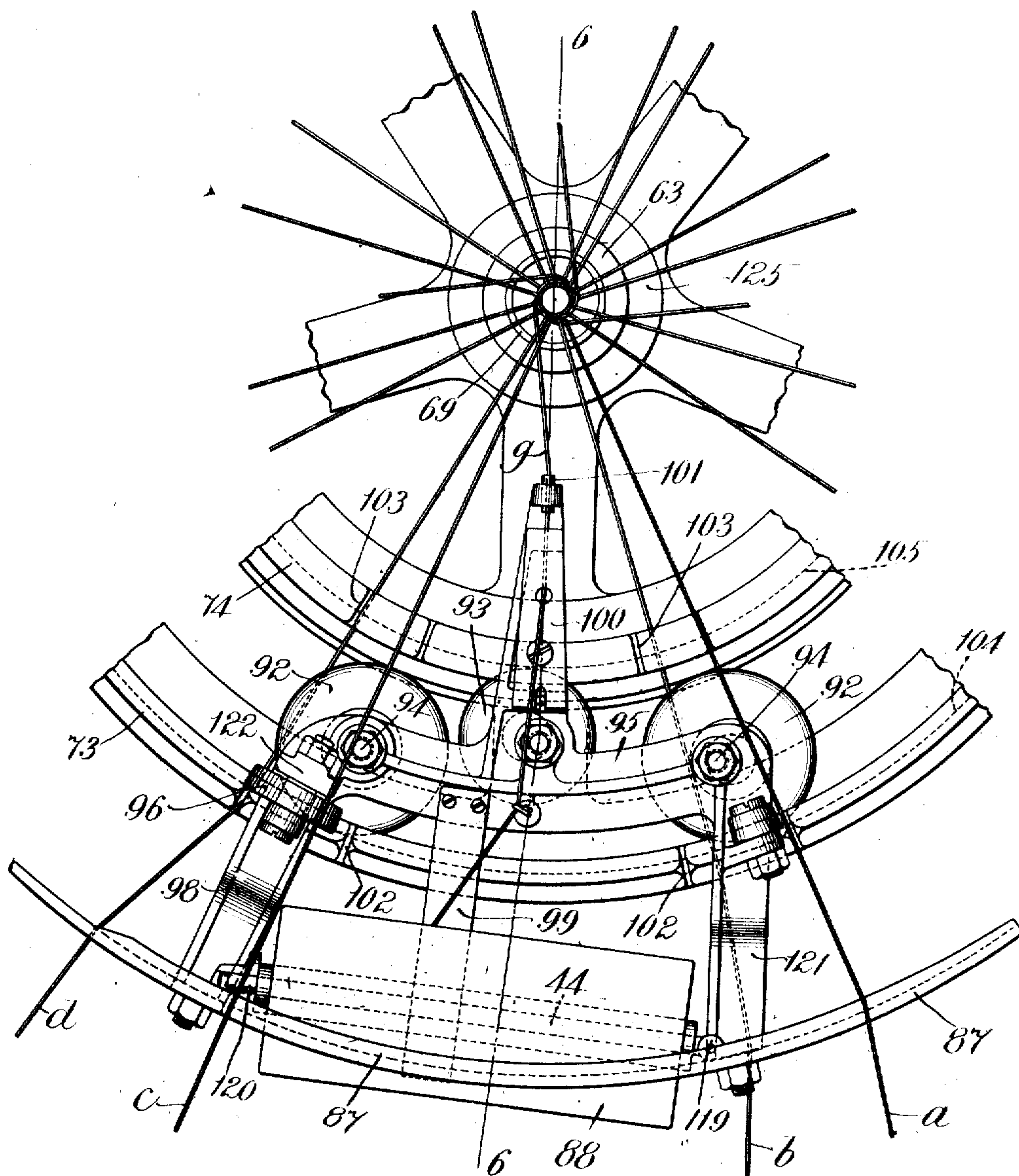


Fig. 3.

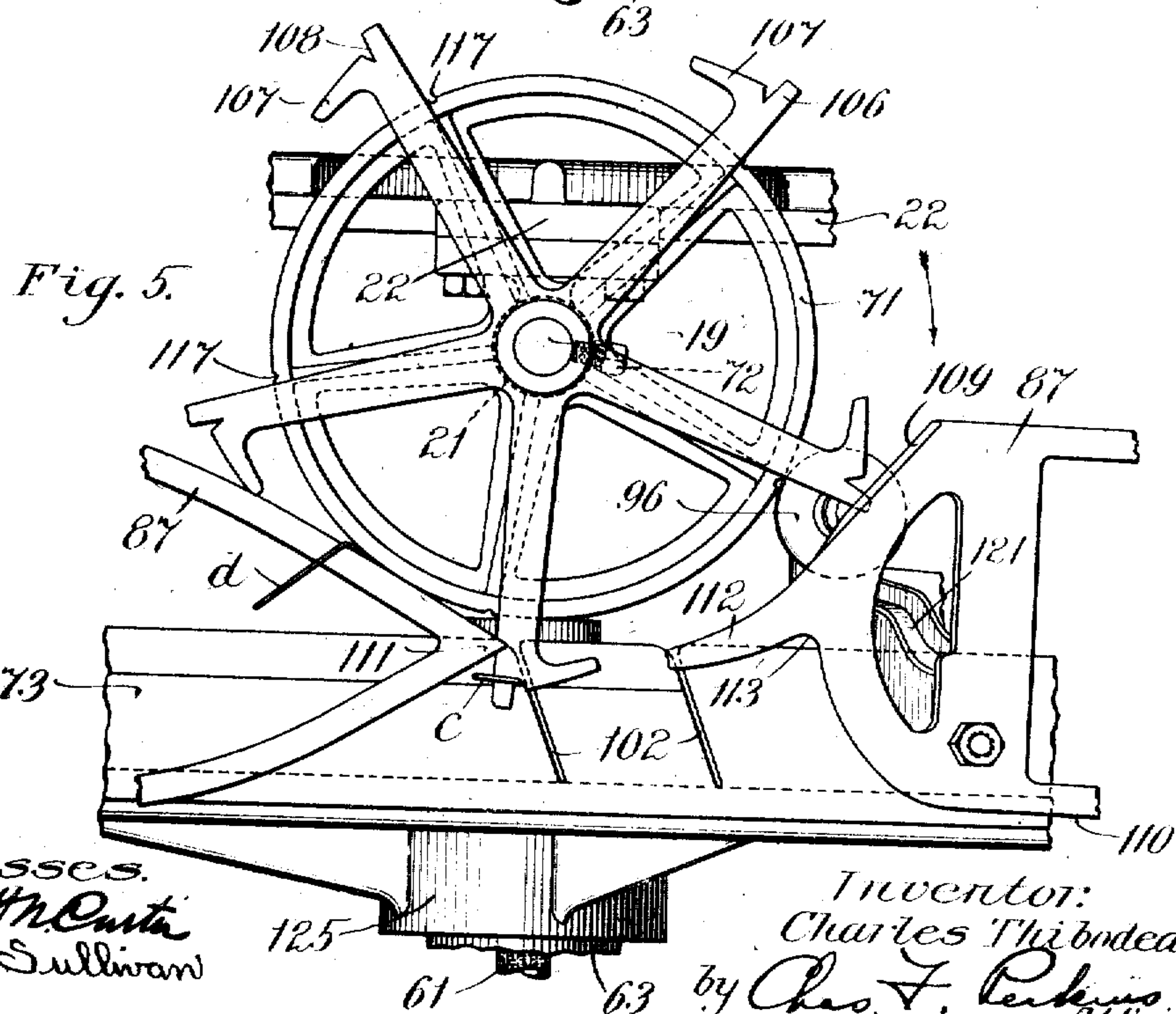
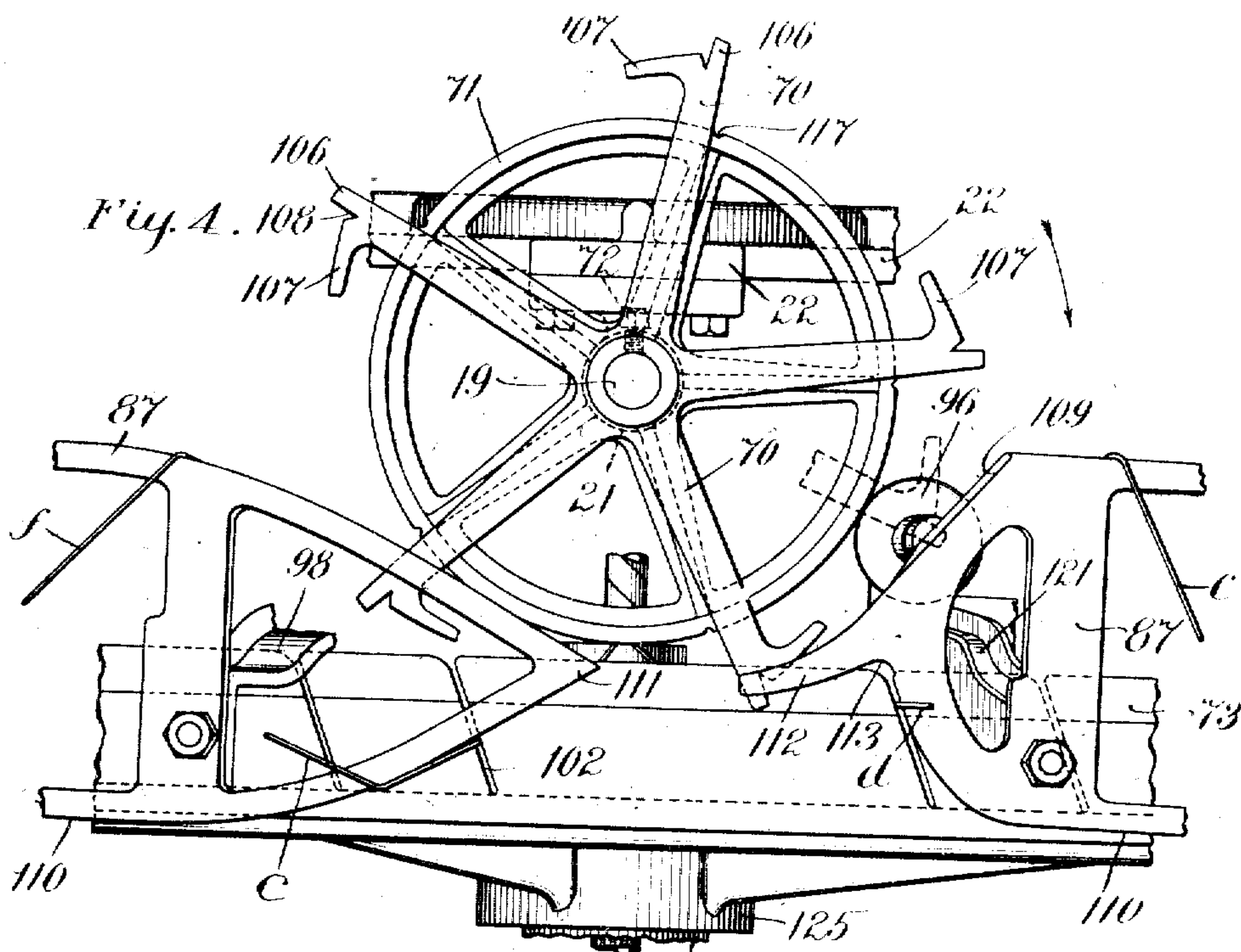
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6 SHEETS—SHEET 4.



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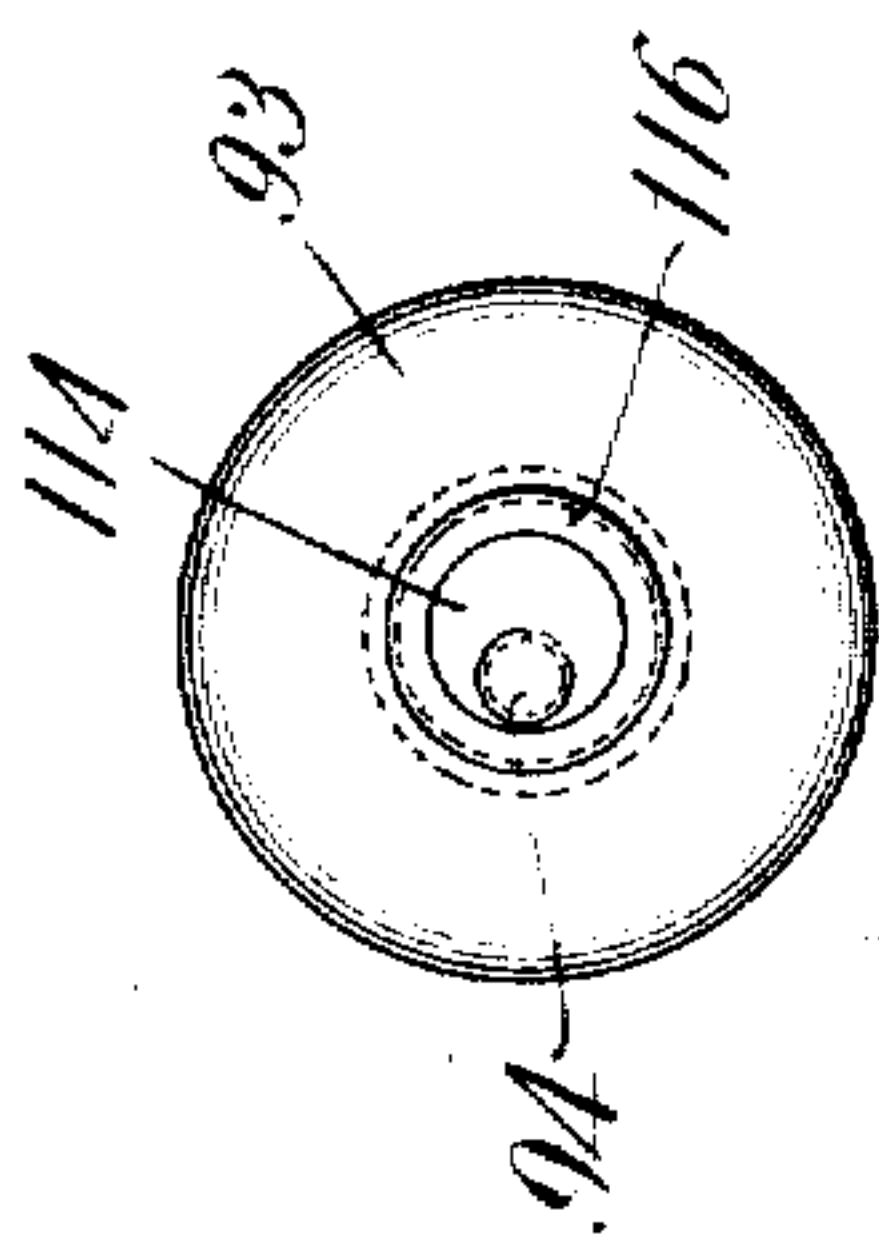


Fig. 8.

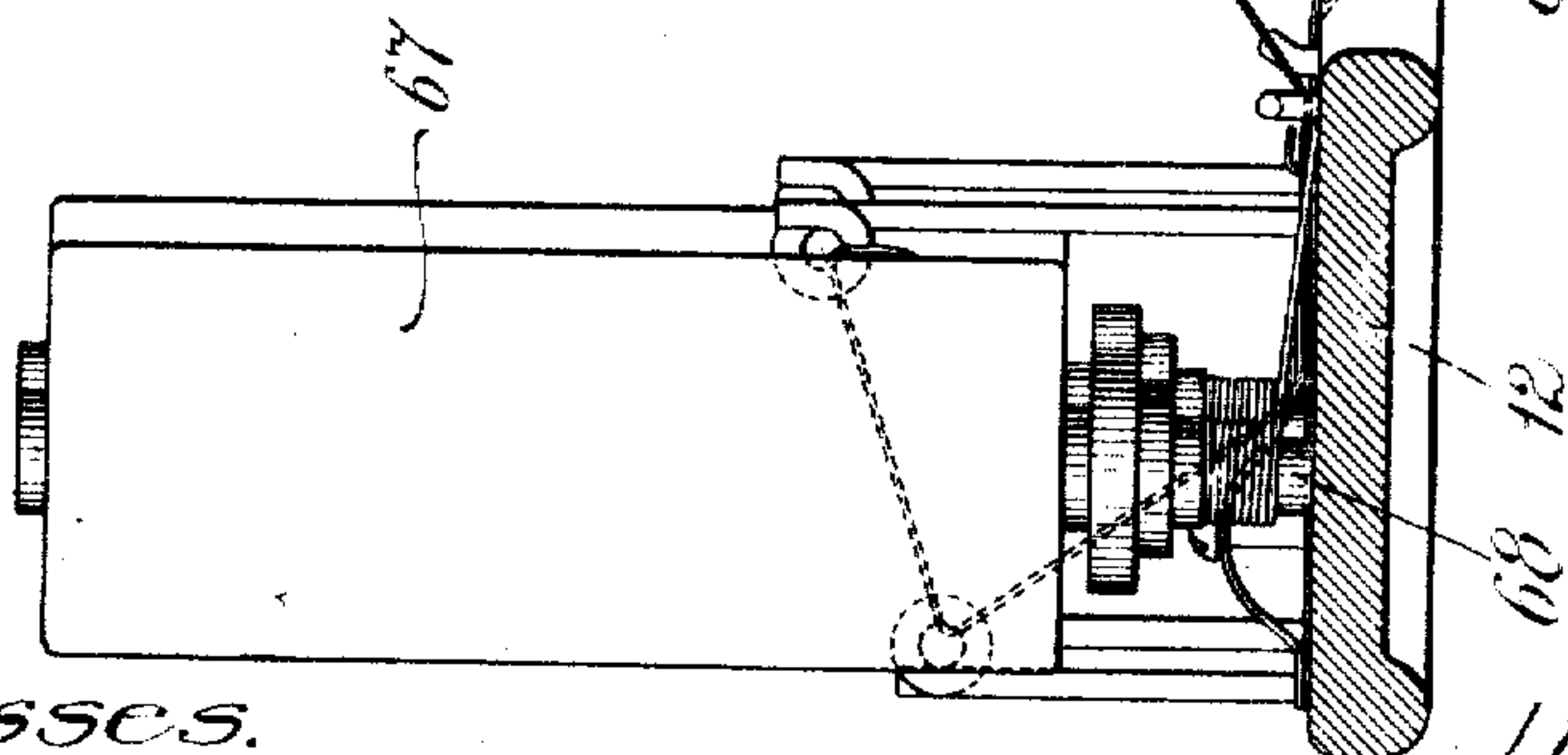


Fig. 6.

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C. THIBODEAU.

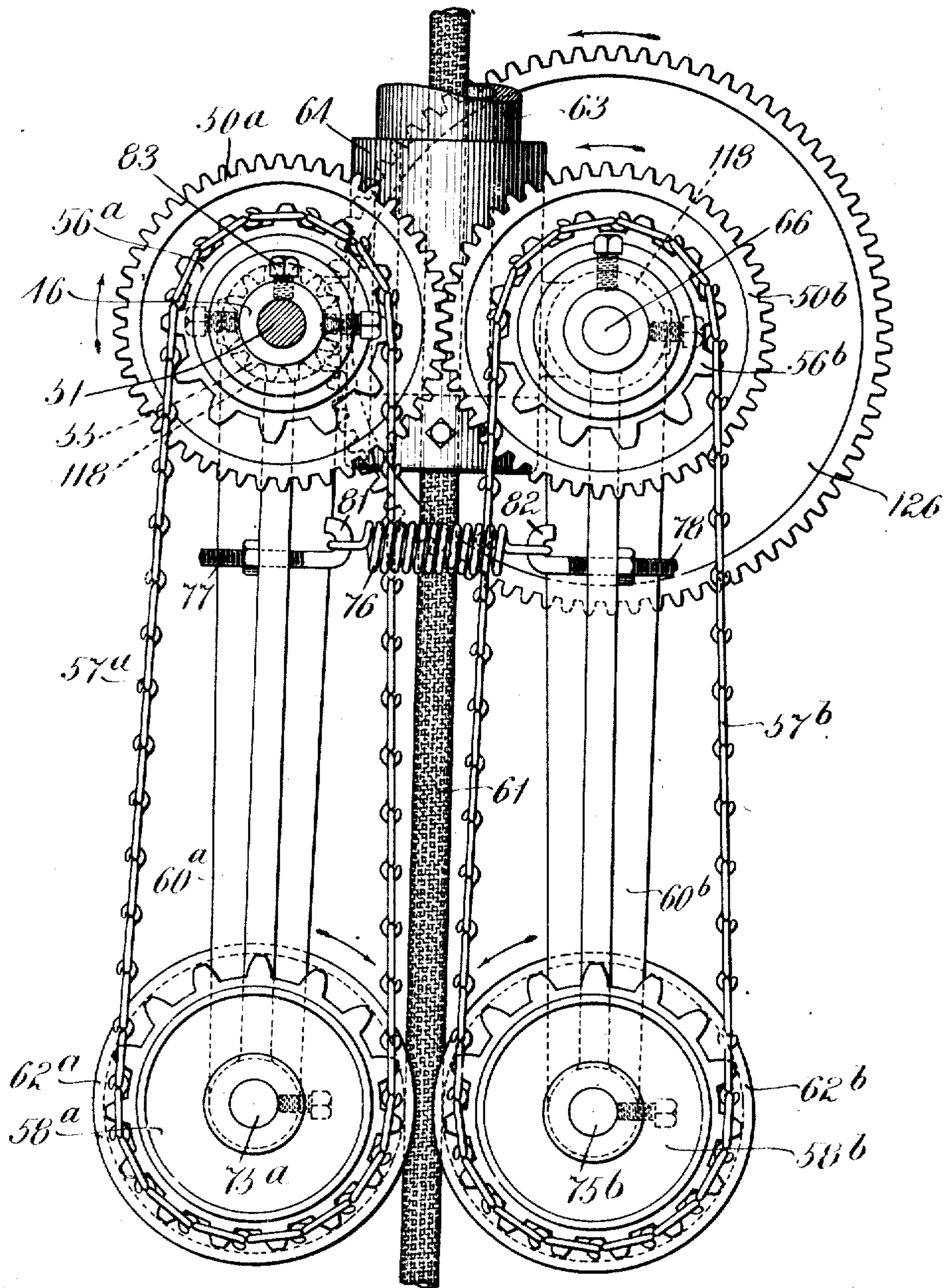
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6 SHEETS—SHEET 6.



Witnesses.
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Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES THIBODEAU, OF CHELSEA, MASSACHUSETTS, ASSG'NOR TO AMERICAN CIRCULAR LOOM COMPANY, OF CHELSEA, MASSACHUSETTS, A CORPORATION OF MAINE.

CIRCULAR LOOM.

No. 910,742.

Specification of Letters Patent.

Patented Jan. 26, 1909.

Application filed September 25, 1907. Serial No. 394,492.

To all whom it may concern:

Be it known that I, CHARLES THIBODEAU, a citizen of the United States, residing at Chelsea, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Circular Looms, of which the following is a specification.

My invention relates to improvements in circular looms, and the object of my invention is to simplify the apparatus now in use for this purpose and reduce the cost of production.

My invention primarily consists in constructing a loom with a shuttle provided with a nose located below the normal plane of the warp threads, so that it will readily pass under the same when in their normal plane, and also providing in said loom a series of rotating arms arranged to depress alternate or other predetermined warp threads below the nose of said shuttle, in order that the weft thread carried by said shuttle will be properly laid between the warp threads.

My invention further consists in the novel features hereinafter fully described and claimed.

Reference is hereby made to the accompanying drawing in which similar numerals of designation refer to similar parts throughout the several views.

Figure 1 is a front elevation of my machine showing the central portion thereof in vertical section. Fig. 2 is a plan view of my machine showing the cop-ring, cops, shuttles, race-way and switch. Fig. 3 is an enlarged plan view of one of the shuttles showing its bobbin, thread guide, and supporting rolls. Fig. 4 is an enlarged view in elevation of the shuttle driver and device for depressing the warp threads, and portions of two adjacent shuttles showing the interval between. Fig. 5 is a view of certain of the parts illustrated in Fig. 4, showing the nose of one of the shuttles about to pass over one of the warp threads, and showing the position of one of the depressing arms at the time this is accomplished. Fig. 6 is a section on line 6-6 of Fig. 3, showing in elevation the cops, rolls and adjacent parts. Fig. 7 is a view in elevation showing in detail the feed rolls and gearing for operating the same. Fig. 8 is a plan view of one of the shuttle rolls showing means for the eccentric adjustment of the same.

Referring to the drawing, 9 represents the legs of my machine which are connected by

means of bolts 11, or other suitable means, to the base-plate 10. 14 are metal posts connected with said base-plate 10 and supporting the cop-ring 12. At intervals on said cop-ring are placed spindles 68 for the purpose of engaging and supporting the cops 67.

15 are posts situated upon the base-plate and supporting the upper frame which essentially consists of two arms 16, located on each side of the hub 124.

27 are bearings suitably connected by bolts 29 with one of the arms 16, and support the main shaft 26, which carries thereon pulleys 37, 38 and 39.

33 is a shipper rod mounted in a guide 32 and secured at one end to the fork 35. 34 is a spring located on said shipper rod between said fork 35 and a casing 36. 30 is a shipper lever connected to said rod 33 and serves the purpose of operating the same.

17 is a sleeve secured in the hub 124 of the upper frame and having on the lower portion thereof a bevel gear 18, which is fast to the said sleeve.

On the main shaft 26 at the inner end thereof is located the bevel gear 25, which in turn connects with a similar gear 24 secured to a spider consisting of a hub 123 moving freely upon said sleeve 17, and bearing thereon the arms 22, each of which supports a bearing 21, in which is located a shaft 19. Mounted on the outer end of each of said shafts is a rotary depressor 70 and a shuttle driver 71, which are secured to said shafts by the set-screws 72, or in any well known manner. On the inner end of each of said shafts 19 is mounted the bevel gear 20, which meshes with the stationary gear 18 and serves to rotate said shafts when said hub 123 is revolved. 28 are ball-bearings between said collar 123 and the shank of said stationary bevel gear 18.

63 is a sleeve which is secured in the hub 53 of the lower frame. Mounted on said sleeve at its upper end and resting upon the hub 53, is the hub 125, which carries upon spokes or arms radiating therefrom the rims 74 and 73 containing the circular grooves or track 104, 105 for the shuttle rolls. 64 is a hub also mounted on said sleeve 63, and secured thereto by the collar 65. Integral with hub 64 are bearings 118 for the shafts 51 and 66. (See Fig. 7.) The shaft 51 is further supported in the bearing 49, secured to the depending arms 48 attached to the base-plate

10. 47 is a gear on said shaft 51 and is connected to the shaft 42 by the gear 45. The said shaft 42 is journaled in the bearing 43 and carries at one end thereof the pulley 40, which is connected with the pulley 39 by the belt 41.

61 represents the product in its progress through the machine.

69 is a short cylinder located near the position where the weaving takes place and over which the warp and weft threads pass to the work.

62^a and 62^b are feed rolls (see Fig. 7) having shafts 75^a and 75^b journaled in suitable bearings at the lower ends of the arms 60^a and 60^b, which are pivotally mounted at their upper ends in the bearings 118 and form bushings for the shafts 51 and 66. 77 and 78 are screw hooks secured to said arms 60^a and 60^b and have their ends 81 and 82 turned upwardly in order to engage with the spring 76, which serves to keep the rolls 62^a and 62^b closely in contact with the work. Mounted on the same shaft as said feed rolls are the sprocket gears 58^a and 58^b which are connected by the sprocket chains 57^a and 57^b to the sprocket gears 56^a and 56^b located on the hubs of the gears 50^a and 50^b. The gear 50^a is loosely mounted on the shaft 51, and meshes with the gear 50^b which is keyed to the shaft 66.

55 is a small gear located at one end of the shaft 51, and meshes with the large gear 126 on one end of the shaft 66.

Referring to Figs. 3, 6 and 8, 95 is the main frame of the shuttle and bears thereon the arms 98 and 121, which are secured to the shuttle-back 87 by stem-screws and nuts or by other suitable means. 44 is a rod or spindle used for supporting the bobbin, and is secured between said arms 121 and 98 by the hinge or pivot 119, and the lock 120. To maintain the bobbin more securely in its position and prevent its unwinding too rapidly, the spring 99 is affixed at one end to said frame 95 by screws or any other suitable means, the other end of said spring bearing against the thread roll. 96 is a drive roll mounted in a standard 122 integral with the shuttle frame and serving as a means of contact with the driving wheel or shuttle driver 71. 92 and 93 are horizontal rolls pivotally mounted on the base of the shuttle frame and are so constructed as respectively to engage with the track 104, 105, and maintain the shuttle in proper position and afford a means of transporting the shuttle in a circular path. The said rolls are preferably mounted as illustrated in Fig. 8, wherein 116 is a bushing in one of said rolls 93 and 114 is a stud, and 94 a pin integral therewith. Preferably said pin is located off the center of said stud, and affords a means of eccentrically adjusting the same on the said shuttle frame 95. 100 is a thread guide and tension

device arranged on the frame of the shuttle, and affords a convenient means for delivering the weft thread through the thread eye 101 to the work.

Referring to Figs. 4 and 5, 71 is the shuttle-driving wheel shown in engagement with the periphery of the drive-roll 96 affixed to the frame of the shuttle as before described. Preferably the said wheel has in its periphery the thread grooves 117, each arranged to engage with a warp thread at the time said thread passes between said wheel and said roll and protect the same from injury. The rotary depressor is here shown constructed of radiating arms 70 about a hub arranged to rotate with the shaft 19. Each of said arms is so arranged and timed as to receive in the slot 108, between the heel 106 and toe 107 at the extremity of said arm, one of said warp-threads, which is engaged while it is still on the inclined surface 109 on the rear end of the shuttle 87. 102 are inclined thread slots in the rim 107, which are adapted to receive and hold the warp threads over which the shuttle passes.

Referring to Figs. 1 and 2, the operation of my machine is as follows:—The pulley 38 is connected with the driving belt, and the shaft 26 thereby caused to rotate. The movement of said shaft is communicated through the gears 25, 24, to the revolving sleeve 123 carrying the shafts 19. By revolving said sleeve the shaft carrying the shuttle driver and rotary depressor is caused to rotate. The shuttles are thus started in motion and are driven in their circular path about the work. The position of the warp threads *a, b, c, d, e, and f*, and their relation to the weft threads is shown in Fig. 3, where the weft threads *g* are seen to pass over and under alternate warp threads. As the shuttle is driven forward (see Figs. 4 and 5) the warp thread *c* shown in engagement with the top of the shuttle at the right passes along the same to the inclined surface 109 and there falls into the slot 108 at the extremity of one of the depressing arms 70, it being timed to engage said thread at this point. Thence the thread is moved by said depressing arm downwardly along said surface 109, passing between the peripheries of the drive wheel 71 and the drive roll 96 to the guide finger 112, by which it is directed into one of the grooves 102. Further proceeding the said warp thread, still borne in the slot of said depressing arm 71, is depressed in said groove 102 by said arm 71 below the nose of the shuttle as shown in Fig. 5, and is held in this position until engaged by the bottom surface of said shuttle and is released from the slot 108. When the shuttle has proceeded on its path sufficiently, the thread *c* will occupy the position shown by thread *d*, (see Fig. 4) and will rise into the recess 113 from whence it passes along the base of the

finger 112 behind the toe 107, and occupies a position above the nose 111 of the succeeding shuttle, which shuttle engages on its upper surface with said thread, and causes it to occupy the position shown by thread *f*. The feed rolls 62^a and 62^b are so timed as to gradually feed the completed product to the floor below, and are operated by the sprocket gears and chain shown connected to shaft 66, which is in turn operated by gearing and shafting connecting the same to the main shaft as above described.

What I claim and desire to secure by Letters Patent is:—

1. In a circular loom, an endless raceway located in the path of the warp threads, a shuttle arranged to move in said raceway, combined with mechanism bearing downwardly upon said shuttle and arranged to drive the same.
2. In a circular loom, an endless raceway located in the path of the warp threads, a shuttle arranged to move in said raceway with its nose below the normal plane of said warp threads, rotating arms moving in advance of said shuttle and arranged to depress predetermined warp threads below the nose of said shuttle, combined with a wheel bearing downwardly upon said shuttle and arranged to drive the same.
3. In a circular loom, an endless shuttle-track situated adjacent to the path of the warp threads, a shuttle having a thread guide at the rear thereof and arranged to ride in said track with its nose located below the normal plane of said warp threads, rotating radial arms mounted on a hub moving in advance of said shuttle, said arms being arranged to depress predetermined warp threads below the nose of said shuttle.
4. In a circular loom, an endless shuttle-track adjacent to the warp threads, a shuttle having a thread guide at the rear thereof and riding in said track with its nose below the normal plane of the warp threads, rotating radial arms mounted on a hub moving in advance of said shuttle, said arms being arranged to depress predetermined warp threads below the nose of said shuttle, combined with a wheel bearing downwardly upon said shuttle and arranged to drive the same.
5. In a circular loom, a shuttle-track adjacent to the path of the warp threads, a shuttle riding in said track below the normal plane of said warp threads, rotating arms arranged to depress predetermined warp threads below said shuttle, a wheel bearing downwardly upon said shuttle and arranged to drive the same, both said wheel and arms

being separately mounted on the same shaft and arranged to rotate in the same direction.

6. In a circular loom, a shuttle-track, a shuttle arranged to move in said track below the normal plane of the warp threads, rotating arms arranged to depress predetermined warp threads below said shuttle, a wheel bearing downwardly upon said shuttle and arranged to drive the same, both said wheel and arms being separately mounted on the same shaft and rotating in the same direction, combined with a finger at the rear of said shuttle for the purpose of guiding said predetermined warp threads to said rotating arms.

7. In a circular loom, a shuttle-track, a shuttle arranged to move in said track below the normal plane of the warp threads, rotating arms arranged to depress predetermined warp threads below the nose of said shuttle, a wheel bearing downwardly upon a drive roll located on said shuttle at the rear thereof and arranged to drive the same, the axes of said drive wheel and drive roll being in a line which is at an obtuse angle with the upper surface of said shuttle-track.

8. In a circular loom, a shuttle-track, shuttles arranged to move in said track below the normal plane of the warp threads, rotating arms arranged to depress predetermined warp threads below said shuttle, a wheel bearing downwardly upon said shuttle and arranged to drive the same, both said wheel and arms being separately mounted on the same shaft and arranged to rotate in the same direction, the ends of said depressing arms being provided with a means of engagement with said warp threads for positively moving the same from the top of one shuttle to the bottom of the shuttle next succeeding.

9. In a circular loom, a pair of arms pivoted at their upper ends on the shanks of a pair of sprocket gears, said arms having bearings at their lower ends, shafts mounted in said bearings, carrying a pair of feed rolls and a pair of sprocket gears, spring-tension means connecting said arms and keeping the periphery of said rolls closely in contact with the work, combined with means for connecting said gears and operating the same, whereby the work is fed out of the loom.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses, this fourth day of September 1907.

CHARLES THIBODEAU.

Witnesses:

J. BUTLER STUDLEY,
EVERETT N. CURTIS.