(No Model.)

5 Sheets—Sheet 1.

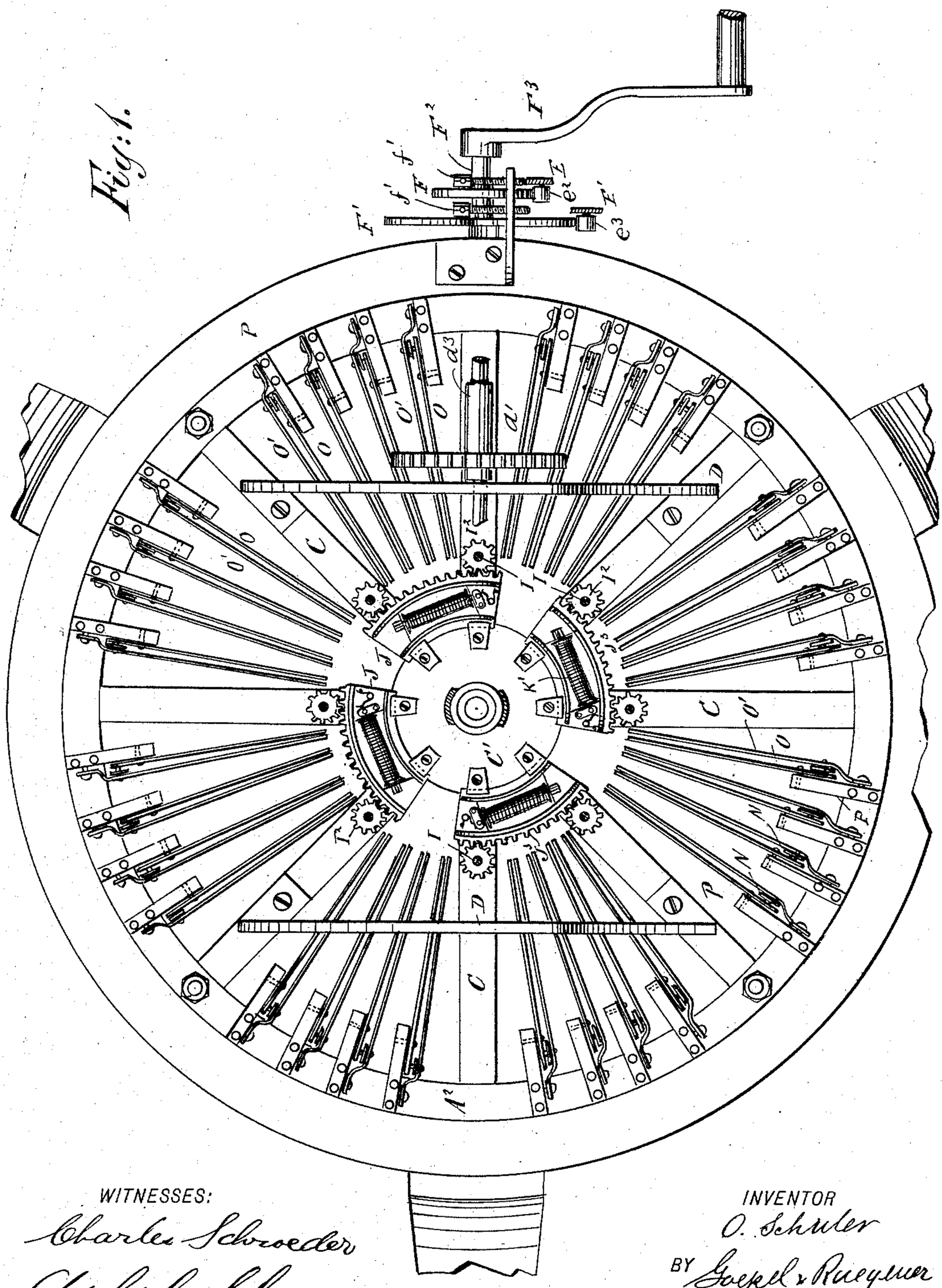
O. SCHULER.

CIRCULAR LOOM.

No. 522,742.

Patented July 10, 1894.

Fig: 1.



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ATTORNEYS.

(No Model.) 5 Sheets—Sheet 2

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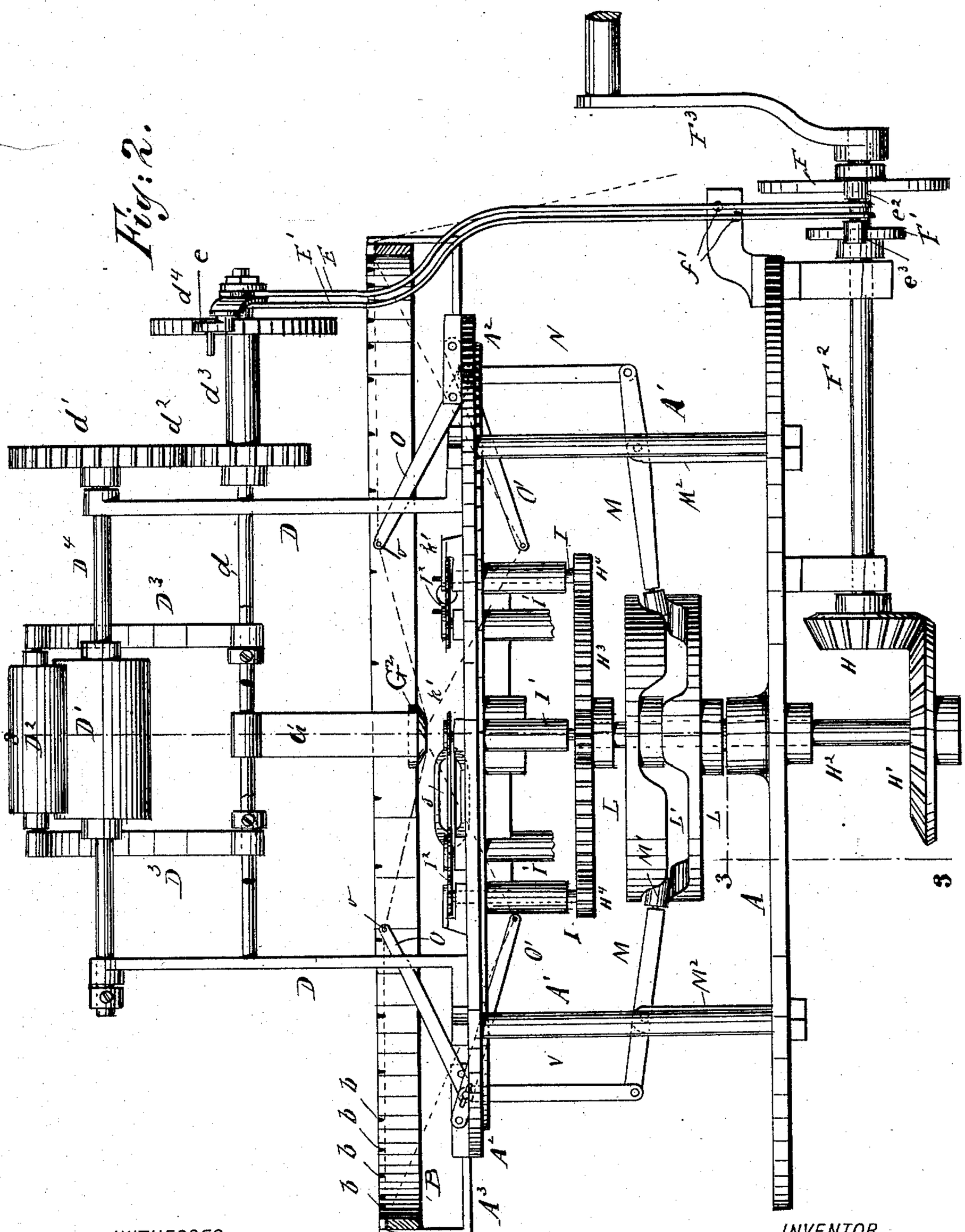
CIRCULAR LOOM.

No. 522,742. Patented July 10, 1894.

Fig: 2.



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CIRCULAR LOOM.

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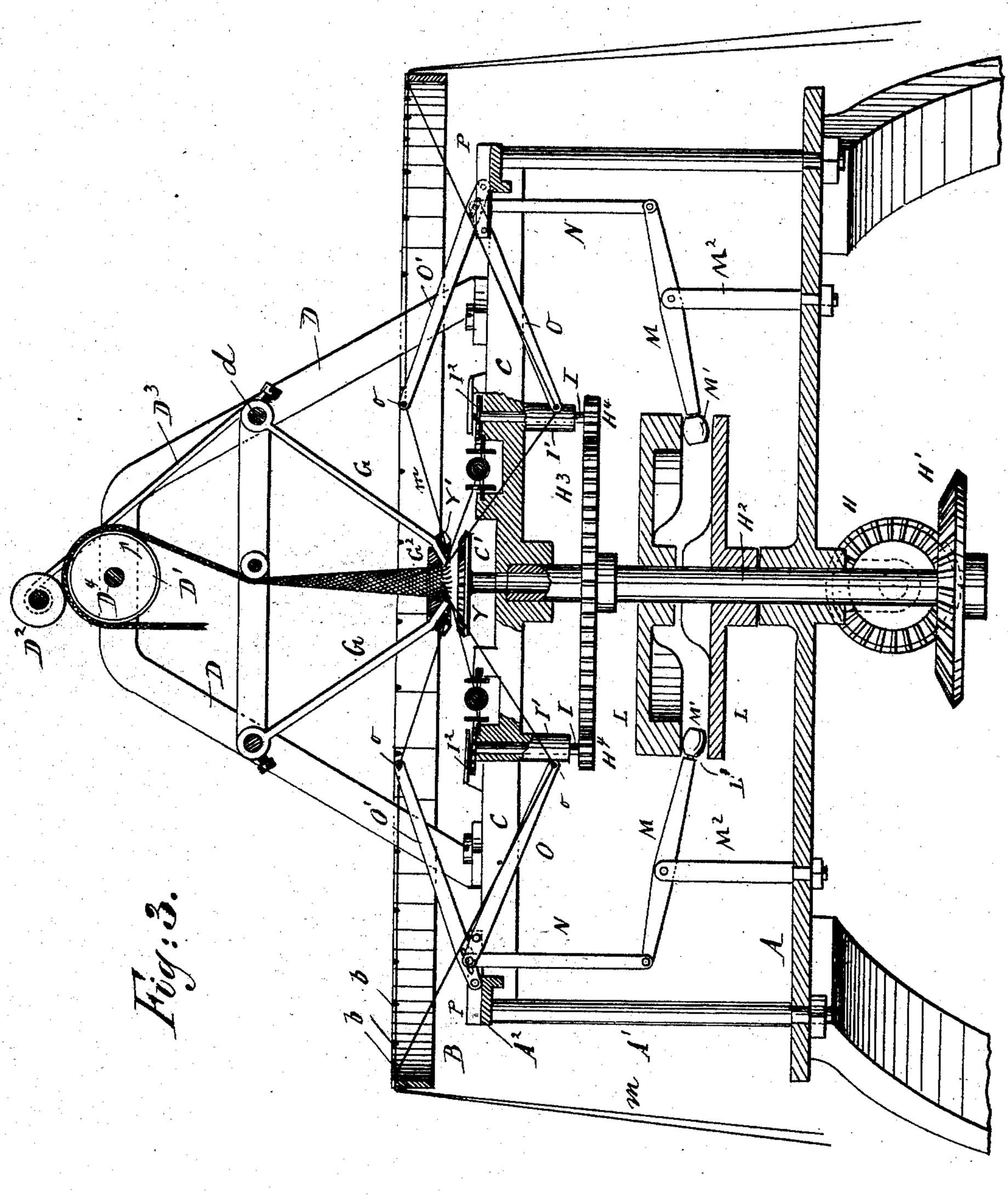

Fig. 3.

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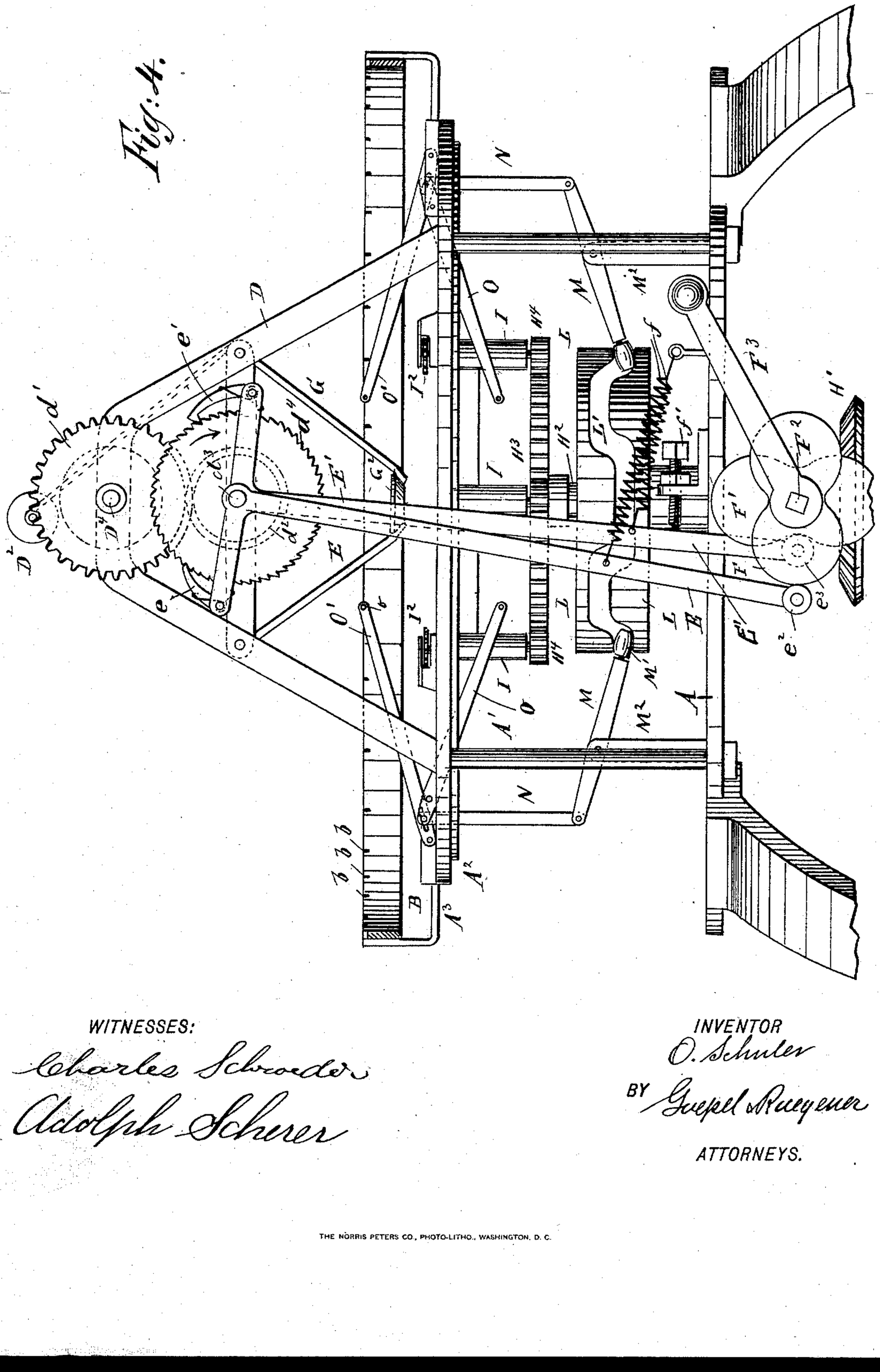
CIRCULAR LOOM.

No. 522,742. Patented July 10, 1894.

Fig: 4.



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(No Model.) 5 Sheets—Sheet 5.

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No. 522,742. Patented July 10, 1894.

Fig: 5.

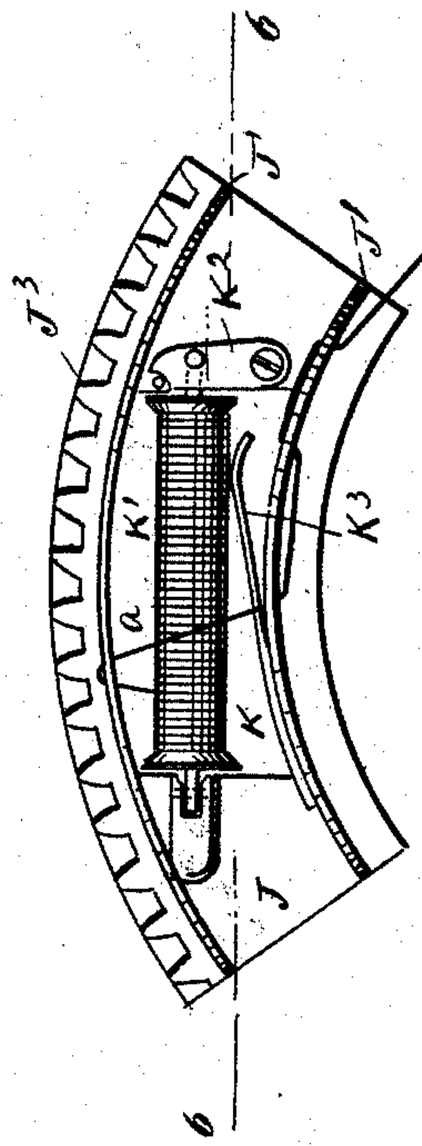


Fig: 6.

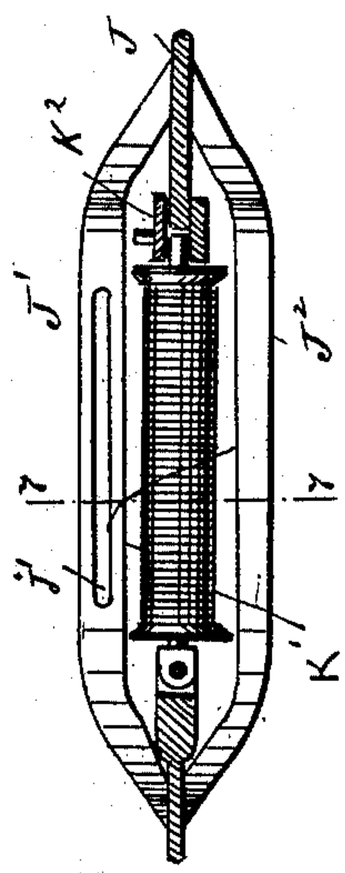


Fig: 7.

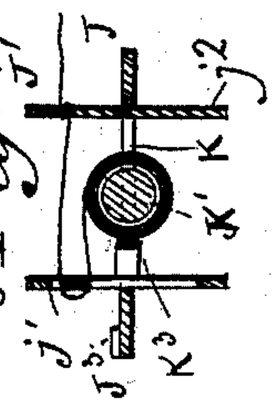
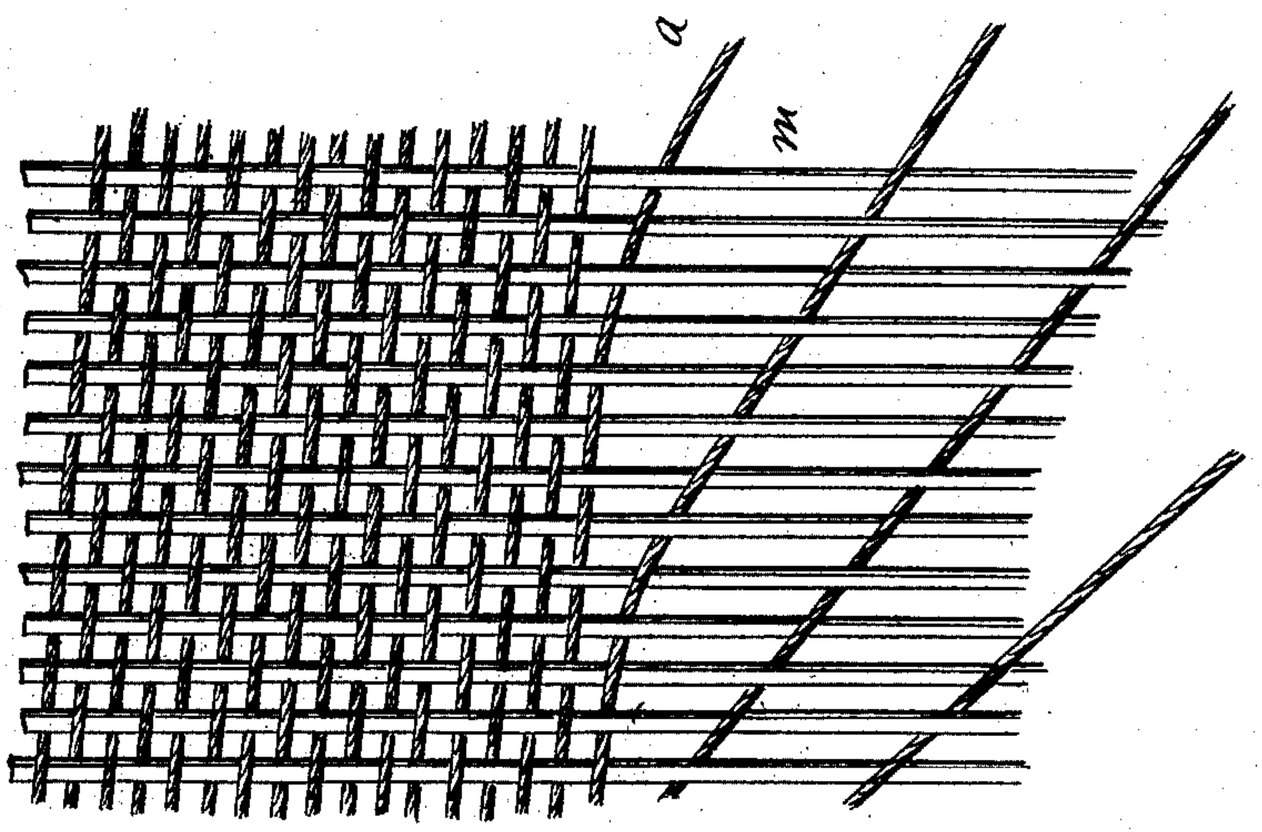


Fig: 8.



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UNITED STATES PATENT OFFICE.

OTTO SCHULER, OF NEW YORK, N. Y., ASSIGNOR OF ONE-THIRD TO MICHAEL WENGERT, OF SAME PLACE.

CIRCULAR LOOM.

SPECIFICATION forming part of Letters Patent No. 522,742, dated July 10, 1894.

Application filed July 19, 1893. Serial No. 480,896. (No model.)

To all whom it may concern:

Be it known that I, OTTO SCHULER, a citizen of the United States, residing at the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Circular Looms, of which the following is a specification.

This invention relates to improvements in looms for weaving circular or cylindrical bodies, such as lamp wicks, bags, &c.; and the object of my invention is to provide a new and improved loom of this kind which is simple in construction, operates rapidly and is not apt to get out of order.

In the accompanying drawings, Figure 1 is a plan-view of my improved circular loom, parts being shown in horizontal section. Fig. 2 is a side-view of the same, parts being shown in vertical section. Fig. 3 is a vertical transverse sectional view of the loom, on the line 3 3, of Fig. 2. Fig. 4 is a side-view of the loom, parts being in section. Fig. 5 is a plan-view of the shuttle. Fig. 6 is a vertical longitudinal sectional view of the same, on the line 6 6, of Fig. 5. Fig. 7 is a vertical transverse sectional view of the same, on the line 7 7, of Fig. 6, and Fig. 8 is an enlarged detail view of the fabric made by the loom.

Similar letters of reference indicate corresponding parts.

The loom is constructed with a cylindrical base-plate A supporting standards A′, on the upper ends of which a ring A^2 is fastened, which ring is provided with brackets A^3 projecting from its outer edge and supporting the ring B provided in its upper edges with a series of notches *b* for guiding the several warp threads, said notches being arranged equidistant from each other.

From the ring A^2 a series of radial arms C project inward and support a central disk C′ for a purpose that will be set forth hereinafter. On two pairs of such arms an inverted V-shaped frame D is erected, in the top of which the fabric roller D′ is journaled, over which the completed fabric passes, a presser roller D^2 resting loosely on the fabric on the roller D′, which presser roller D^2 is supported in arms D^3 hinged to one of the rods *d* of the frame D.

The fabric roller D′ is fixed on a shaft D^4, on one end of which is fixed a cog-wheel *d′* that engages a cog-wheel d^2 on a shaft d^3 in the frame D, which shaft d^3 also carries a ratchet-wheel d^4.

Two levers E E′ are mounted to rock on the shaft d^3 and are provided at their pivoted ends with rectangular projecting arms, of which one carries at its end the spring-actuated presser-pawl *e* and the other the spring-pressed hook-pawl *e′*, which pawls *e e′* engage the ratchet-wheel d^4, so that as the levers E E′ swing said ratchet-wheel is rotated in the direction of its arrow, Fig. 4, by the pawls, and by means of the cog-wheel d^2 and *d′* rotates the fabric roller D′ in the direction of its arrow Fig. 3. The lower end of the levers E E′ carry the rollers e^2 and e^3, upon which the two cams F F′ act. The cams F, F′, are fixed on the main driving-shaft F^2 provided with a suitable crank-handle F^3, or, if desired, with a pulley for operating the machine by power.

Helical springs *f* are connected with the levers E E′ and the frame of the machine and draw said levers E E′ toward the adjustable stop-screws *f′ f′*, by means of which the throw of said levers can be adjusted and thus the amount of fabric rolled or drawn up for each rotation of the shaft F^3 be controlled.

From the rods *d* of the frames D arms G project downward and at their lower ends support a guide-ring G^2 for the circular or cylindrical fabric. According to the diameter of this fabric the ring G^2 can be replaced by a larger or smaller ring.

The shaft F^2 carries at its inner end a beveled cog-wheel H that engages the bevel cog-wheel H′ on the lower end of a vertical shaft H^2 suitably journaled in the disk C′ and in a neck of the bottom plate A of the machine, which shaft H^2 carries a large horizontal cog-wheel H^3 that engages a series of pinions H^4 on the lower ends of vertical shafts I guided in sleeves I′ on the inner ends of the arms C, which shafts I′ are provided at their upper ends with pinions I^2 rotating in a horizontal plane, and serve to shift the shuttles. These are constructed as shown in Figs. 5, 6 and 7 and consist of a segmental plate J provided with two flanges J′ projecting from the top

and two flanges J^2 from the bottom surface a short distance inward from the curved edges.

The outer or convex edge of the shuttle is provided with a curved rack J^3 adapted to engage the teeth of the pinions I^2. The plate forming the shuttle is provided with a recess K, at the ends of which bearings are formed for the spindle of the bobbin or spool K′, which is held in place by a latch K^2 pivoted on the shuttle-plate J. A tension spring K^3 is fastened to one of the webs or ribs J′ and bears against the spool or shuttle. The thread *a* passes from the spool or bobbin under the outer flange J′, then through the slot *j′* of said outer web, then back over the spool and downward and through apertures in the inner web or flange J′, as shown in Figs. 5 and 7.

The side edges of the shuttle plates run in tracks formed in the edges of the arms C, and in the outer edge of the central plate C′, and the shuttles are also held in place by clips *k′*. As the pinions I^2 rotate they move the shuttles around the central plate C′ on a circular line, a uniform space or opening remaining between the adjacent ends of each two shuttles.

The vertical shaft H^2 carries two disks L L, between which a cam-track L′ is formed, and in said cam-track the rollers M′ run, that are mounted on the ends of levers M pivoted on standards M^2 of the base-plate. The outer ends of said levers M are connected by links N with the inner ends of thread-guiding or heddle levers O pivoted to the clips P fastened to the ring A^2.

The heddle levers O O′ are arranged in pairs, one set of levers O′ being pivoted to the clips P at the outer ends of the levers and the other set O being pivoted to the clips a short distance from the outer ends, the links N being pivoted to the outer ends of those levers O that are pivoted to the clips a short distance from said outer ends, and the said links N being pivoted to the heddle levers O′ that are pivoted at their outer ends a short distance from said outer ends, as is clearly shown in Fig. 3.

I have shown four groups of two heddle levers O O′ each, between each two arms C; but it is evident that more or less may be arranged as circumstances may require, and for each two groups of pairs of heddle levers I have provided a shuttle.

The cam-track L′ must have as many offsets as there are groups of pairs of heddle levers, for a reason that will be hereinafter stated.

The warp-threads *m* pass from suitable rolls or spools through the guide notches *b* in the top edge of the ring B and then through the eyes *o* in the free ends of the heddle levers O O′ and from there to that part of the fabric just completed, that is, at the bottom edge of the ring G^2.

I have shown but one thread passing through the eye of each heddle lever, but it is evident that two or more threads may be passed through the eye of each heddle lever without requiring any change in the construction of the machine.

The operation is as follows:—The main driving-shaft is turned either by means of a crank or power and rotates, by means of the gearing shown and described, the vertical shaft H^2, whereby the disks L, between which the cam-track L′ is formed, are rotated in a horizontal plane and rock the levers M up and down, whereby the several pairs of heddle levers O O′ are rocked up and down alternately, so as to form the necessary crosses for weaving. At the same time the cog-wheel H^3 is rotated, as the same is fixed on the shaft H^2, and it rotates the several spindles I, from which, by means of the gearing described, the several shuttles are rotated in a circle around the disk C′, whereby the shuttles are passed through the sheds formed by the warp-threads on account of the up and down movement of the several heddle levers. The fabric is thus formed by the interweaving of the threads on the shuttles with the warp-threads and the fabric is drawn up as woven by the feed-roller D′, which is rotated by means of the ratchet-wheel d^4 and the pawls *e e′* that are operated from the cams F′ F^2 and the levers E E′, as shown.

As stated, any number of groups of heddle levers can be arranged according to the nature of the fabric, and a corresponding number of offsets in the track L′ must be arranged, so that the warp-threads make a new cross every time a shuttle has passed them.

The nature of the weaving is clearly shown in Fig. 8, in which the heavy vertical lines represent the warp-threads and the lighter horizontal lines and partly inclined lines represent the shoot taken from the shuttles.

Accordingly as lamp wicks of different sizes or bags of different diameters have to be woven the ring G^2 must be replaced by another, as far as the size of the machine will permit.

As shown in Fig. 3, a toothed circular guide Y and Y′ may be provided for the warp threads.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination with a ring, of a series of heddle levers O′ pivoted to the same at the ends of said levers, as many levers O as there are levers O′ pivoted to said ring a short distance from the ends of said heddle levers O′, the heddle levers O being pivoted at their ends to the heddle levers O′ a short distance from the ends of said heddle levers O′, connecting-rods N pivoted to the heddle levers at the point where they are pivoted to each other, pivoted levers M connected with the levers N, a cam-track acting on the levers M, a vertical shaft arranged at the center of the

ring and carrying the cam-track for operating the levers M, a circular shuttle track concentric with the vertical shaft, shuttles mounted to move in said track, and gearing for operating said shuttles from the central vertical shaft, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

OTTO SCHULER.

Witnesses:
OSCAR F. GUNZ,
CHARLES SCHROEDER.