A. E. CHERNACK.

CIRCULAR LOOM.

APPLICATION FILED JULY 3, 1908.

920,728.

Patented May 4, 1909.

5 SHEETS—SHEET 1.

Fig. 1.

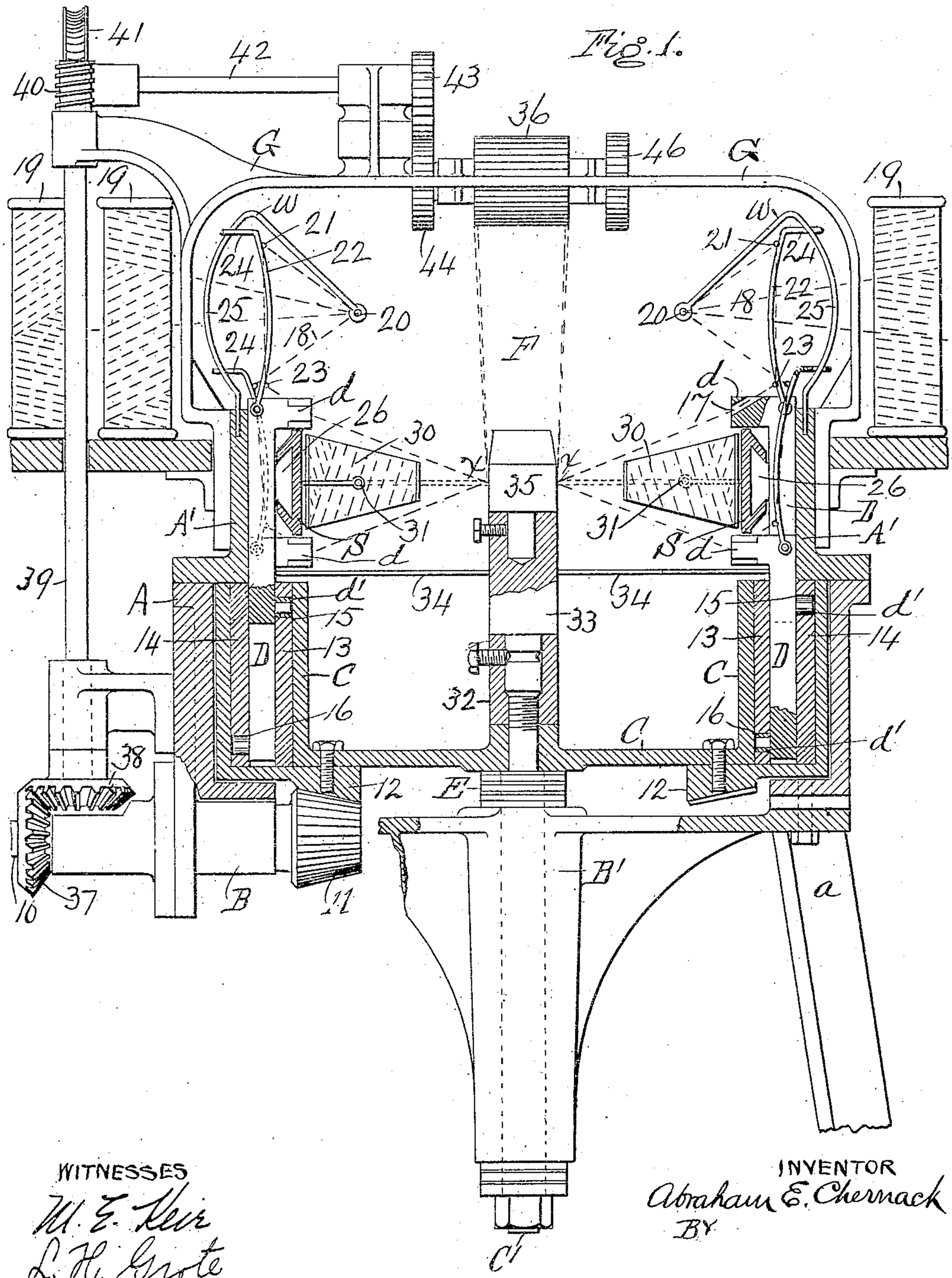

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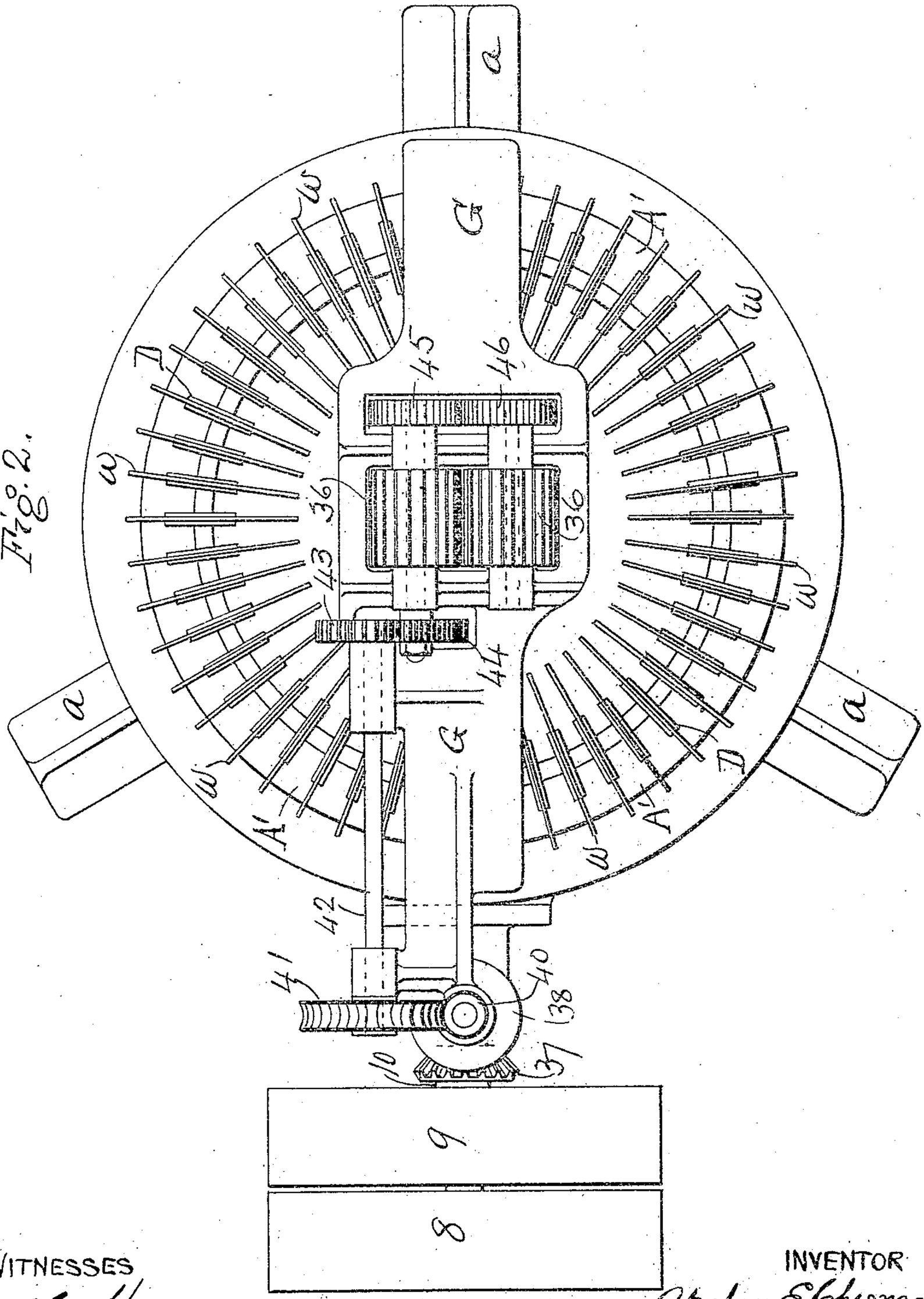
Fig. 2.



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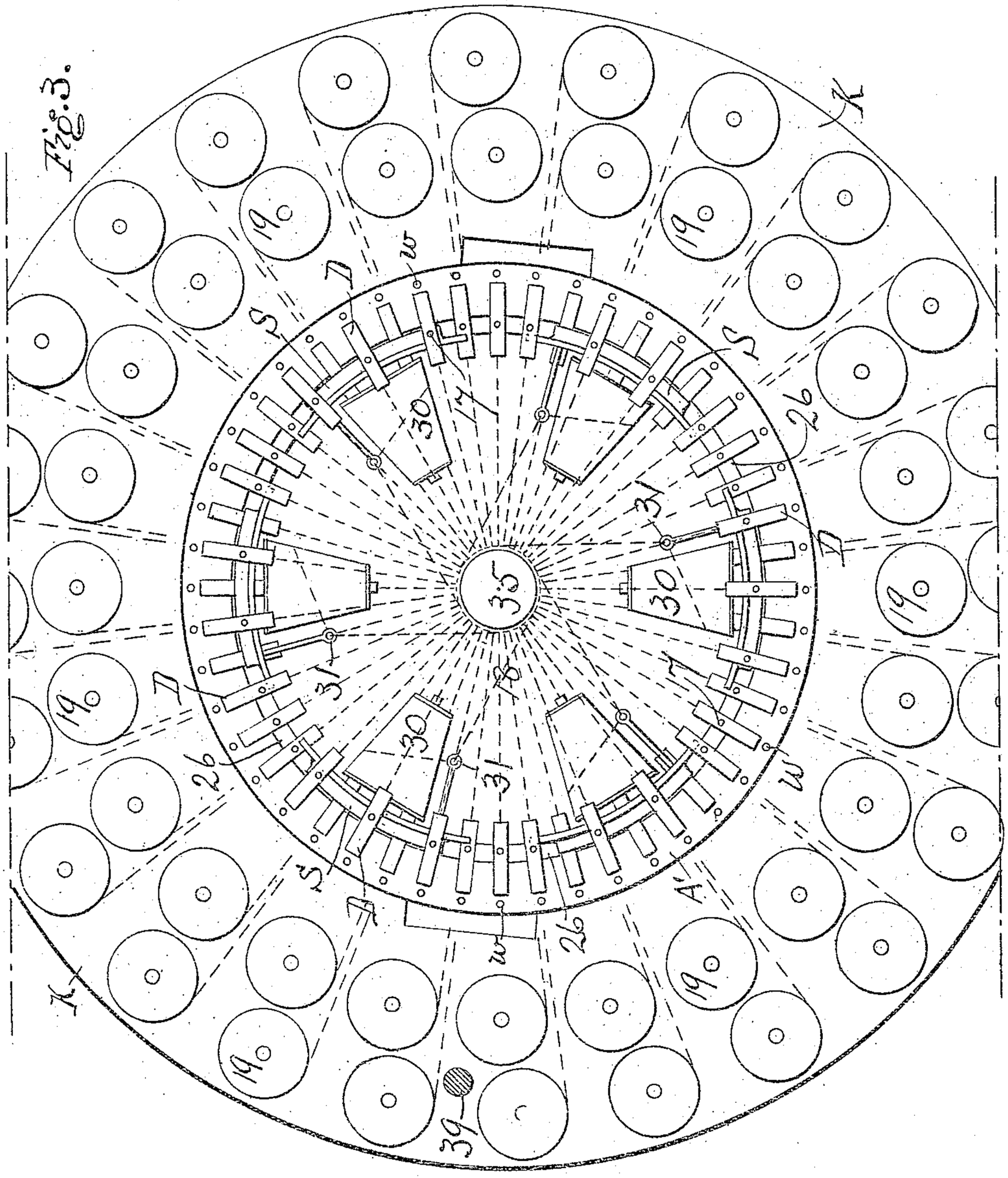
5 SHEETS—SHEET 3.

Fig. 3.



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5 SHEETS—SHEET 4.

Fig. 5.

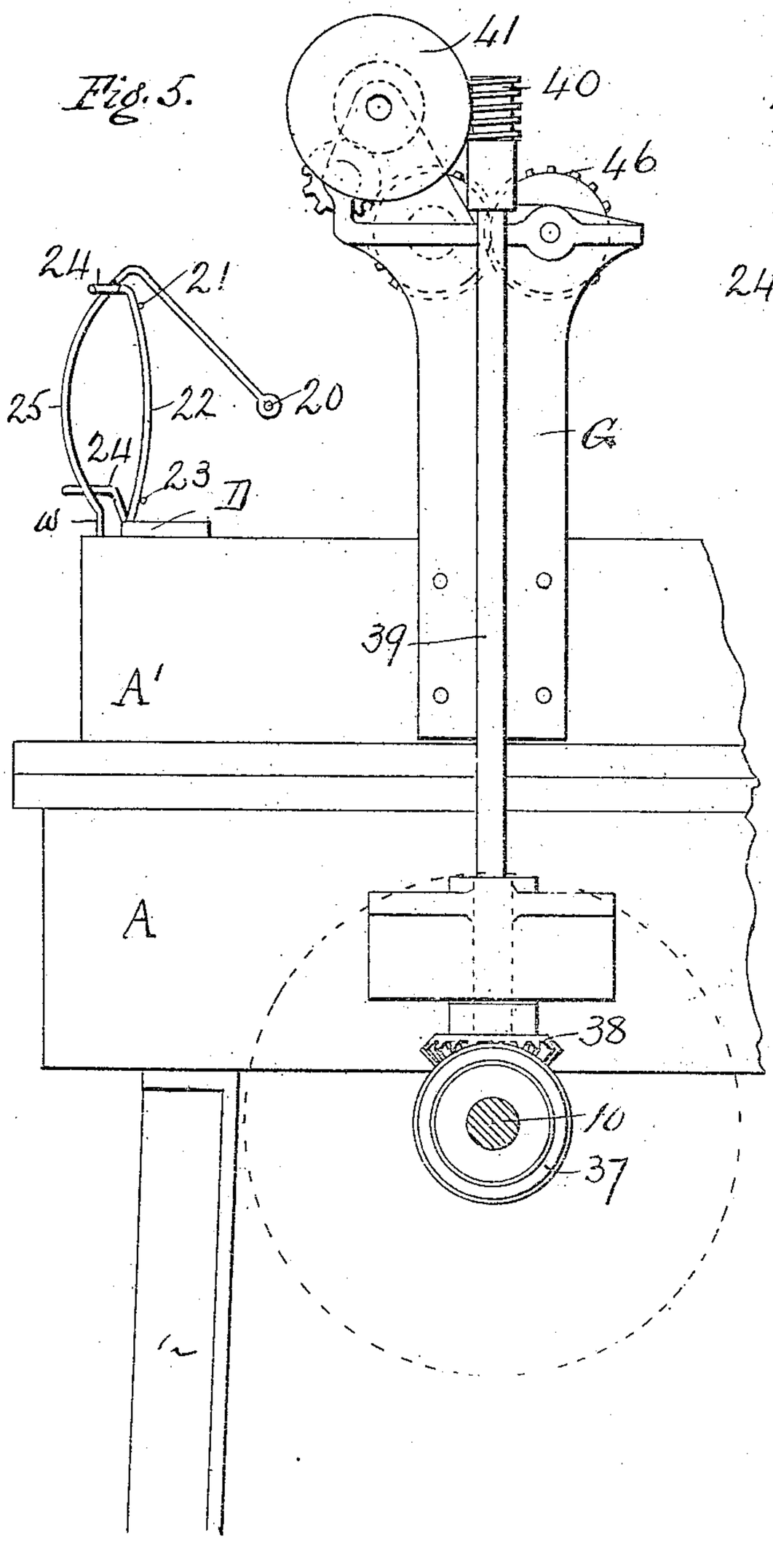


Fig. 4.

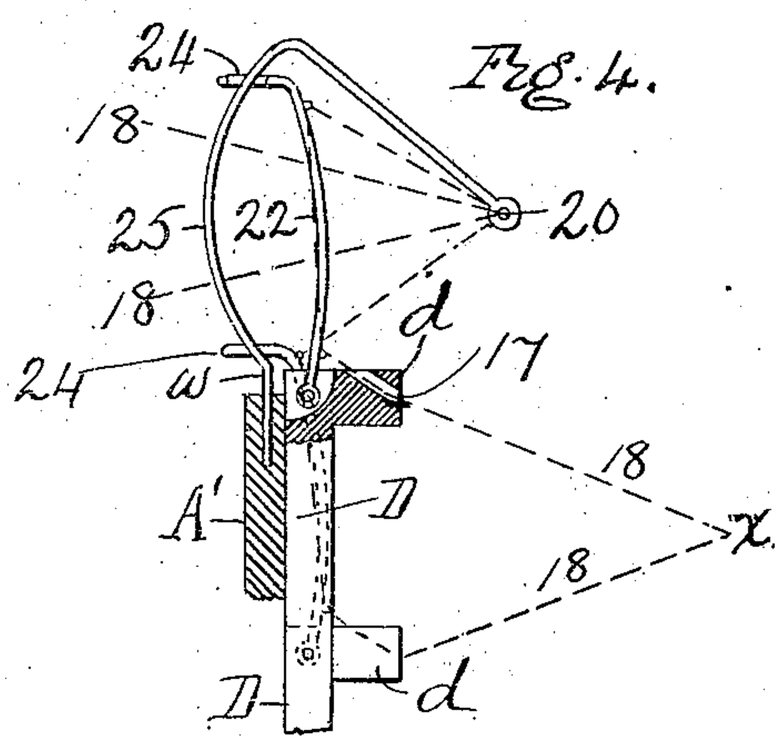
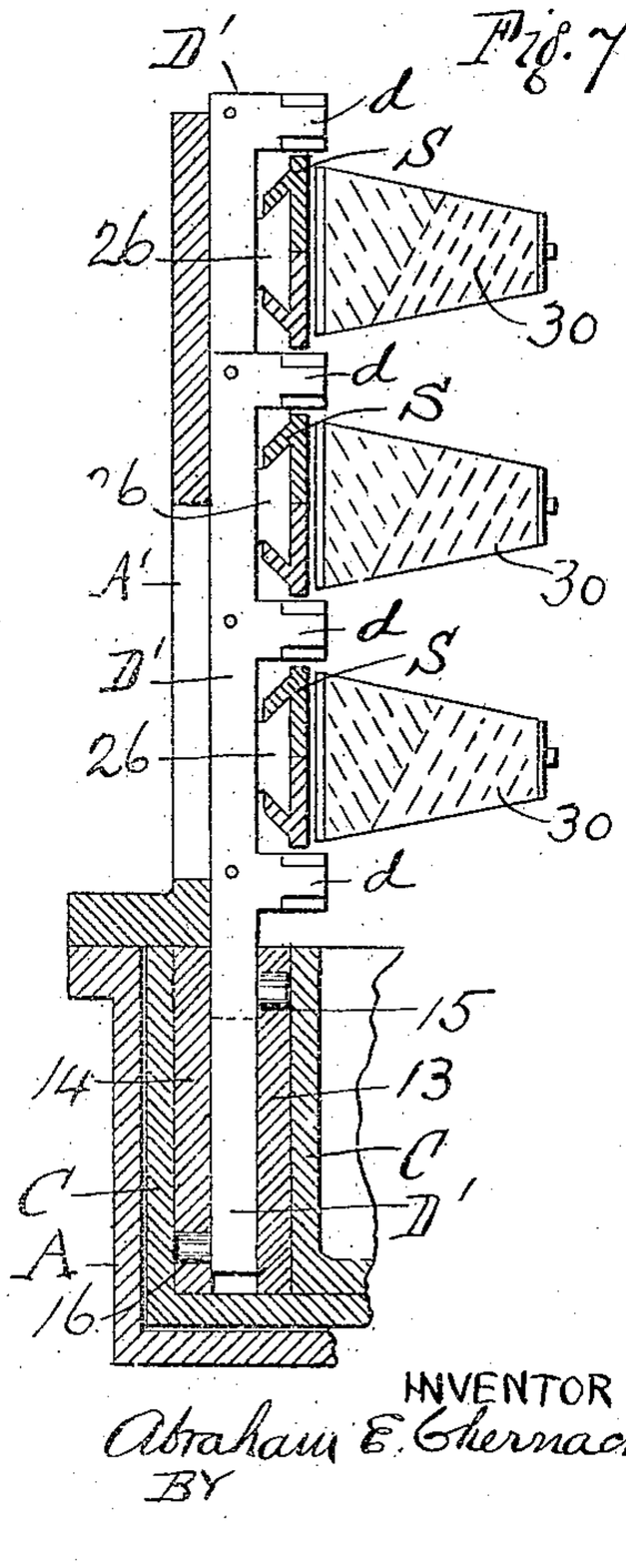


Fig. 7.



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5 SHEETS—SHEET 5.

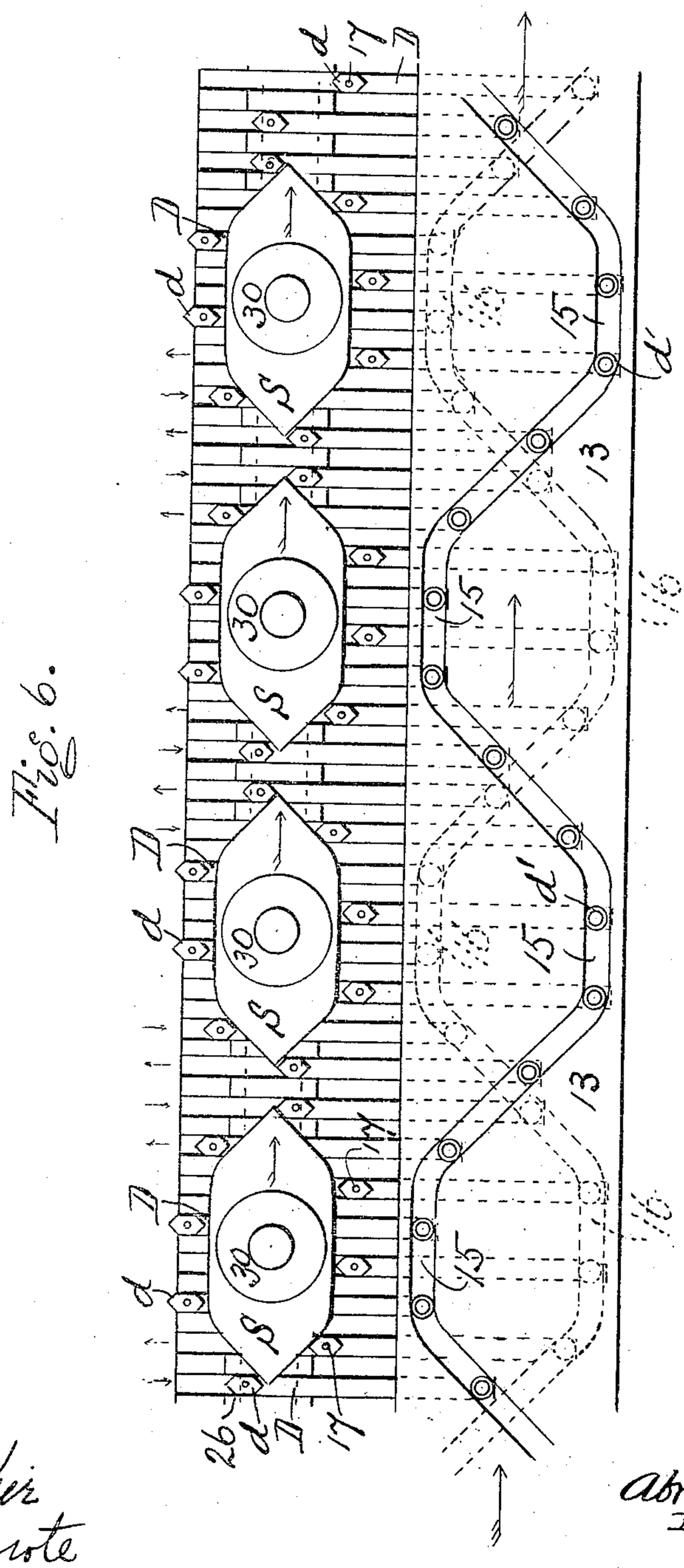

Fig. 6.

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UNITED STATES PATENT OFFICE.

ABRAHAM E. CHERNACK, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO CHERNACK CIRCULAR LOOM COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

CIRCULAR LOOM.

No. 920,728. Specification of Letters Patent. Patented May 4, 1909.

Application filed July 3, 1908. Serial No. 441,929.

To all whom it may concern:

Be it known that I, ABRAHAM E. CHERNACK, a subject of the Emperor of Russia, and a resident of Boston, in the county of Suffolk, in the State of Massachusetts, have invented a certain new and Improved Circular Loom, of which the following is a specification.

My invention relates to that class of circular looms, which are designed for weaving all kinds of tubular fabrics, such as hose, etc., and the main object of my invention is to so construct the loom as to be able to drive it at a comparatively high rate of speed, and this without injury to the threads, particularly the warp threads. This object I attain by the construction hereinafter described.

In the accompanying drawings, Figure 1 is a vertical section of a circular loom constructed in accordance with my invention; Fig. 2 is a plan view of the same, the bobbin table being omitted; Fig. 3 is a plan view of the machine, with the fabric take-up mechanism and its frame removed, together with the thread eyes and take-up devices for the individual warp threads; Fig. 4 is a detached sectional view of the thread eyes and take-up for warp threads; Fig. 5 is a view of the mechanism for transmitting motion from the main shaft to the fabric take-up rolls; Fig. 6 is a diagram, showing a development of the cams for actuating the warp thread guides and the relation of the latter to the shuttles actuated by the guides; and Fig. 7 is a vertical section illustrating a modification.

Referring more particularly to Fig. 1, A is a cylindrical frame or casing, which may be supported in a vertical position, as shown, by legs *a*, *a*. It carries a bearing B for a main shaft 10, to be driven in any suitable way, as by means of a belt over fast and loose pulleys 8, 9, Fig. 2. Within the casing A is a rotary cam wheel C, driven from the shaft 10, through bevel gearing 11, 12, Fig. 1. This wheel carries in its two cylindrical parts cam plates 13 and 14, with cam grooves 15 and 16 respectively, to act upon antifriction rollers d^1 on the lower ends of the vertical warp-thread guides D. These guides are guided vertically in slots or grooves on the inner face of a cylinder A^1 fixed on the top of the frame A, and the guides, which are spaced at suitable distances apart around the cylinder A^1 (Fig. 3) have at their upper ends projections *d* with eyes 17 for the passage of the warp threads. The rollers d^1 at the lower ends of the guides D face in opposite directions on alternate guides, so that every other guide will be actuated by one cam 15, and the intermediate guides by the other cam 16. The relations of the two cams to each other will be understood by reference to Fig. 6, from which it will be seen that as one warp-thread guide goes up or is held up, its immediately adjacent guides are descending or being held down, for the usual formation of the sheds.

The built-up cam wheel C has a spindle C^1 turning in ball bearing E in the bracket B^1, and has at its upper end a hub 32, hollowed out to receive and support a mandrel 33. This mandrel 33, which may be prevented from turning by rods 34 secured in the cylinder A^1, carries at its upper end a forming head 35, which is removable to permit of the use of different sizes of forming heads for the weaving of tubes of different diameters.

The warp threads are carried by bobbins 19, Figs. 1 and 3, mounted upon an annular table secured to the outside of the frame, and each warp thread 18 runs from its bobbin 19 to a fixed eye 20 on a bent wire *w*, shown as secured in the top of the cylinder A^1. From 20 the thread passes to an eye 21 at the upper end of an oscillating wire 22, hinged at its lower end to the guide D; at its upper end 24 the wire 22 embraces and is guided by the curved portion 25 of the wire *w*. From the eye 21, the warp thread passes to the eye 17 in the upper end of the vertically reciprocating guide D either directly or indirectly through a second eye 23 (Figs. 1 and 5) on the wire 22. The curve 25 of the stationary wire *w* is such that as the warp-thread guide D rises and falls, the consequent oscillating movement of the thread guide 21 will give a lateral motion to the loop of thread to exactly compensate for the varying distance of the eye 17 from the weaving point *x*, or in other words will take the slack of the thread, and consequently uniform tension of all the warp threads will be maintained at all times.

The weft threads are supplied from bobbins 30 carried in horizontal positions on traveling shuttles S, the threads being passed through guide eyes 31, Figs. 1 and 3, to the weaving point or forming head 35, where the weft threads are laid into the successive sheds.

In the drawings I have shown six shuttles S, but of course the number may be varied to suit requirements. These shuttles S are mounted to travel in a circular path in a horizontal plane within the cylinder A^1, and for this purpose the latter is provided with a dovetailed race-way 26, on which the shuttles run, this race-way being formed by projections between the grooves in which the guides D are vertically guided, Fig. 6.

The shuttles are driven forward on this annular race-way continuously in the same direction by means of the vertically reciprocating guides D, whose projecting heads *d* are beveled as shown in Figs. 1 and 6 to act upon the correspondingly beveled ends of the shuttles.

As seen in Fig. 6, the cam wheel is assumed to be moving in the direction of its arrow, and the shuttles S are intended to travel in the direction of their several arrows in that view. The cams 15 and 16 acting upon the guides D cause their beveled upper projections *d* to bear upon the beveled rear ends of the shuttles and drive them with a wedge-like action forward in the direction of their arrows, and as a shuttle passes beyond the action of one guide D, rising or descending, another guide comes into action. By preference, two guides are in action at all times on each shuttle, pressing on the upper and lower edges of the beveled rear of the shuttle to urge the latter forward.

The woven tubular fabric F (Fig. 1) is drawn off or taken up by feed rolls 36, Fig. 2, which may receive their motion from the main shaft 10 through any suitable transmission, such as bevel gears 37, 38, shaft 39, worm 40, worm wheel 41, shaft 42, gearing 43, 44 and gears 45, 46, Figs. 1, 2 and 5. By change of gears at 43, 44, the speed may be changed.

The machine may be constructed to weave two-ply or three-ply fabrics by using a number of superposed shuttles S and race-ways 26, and providing each vertically reciprocating guide D^1, Fig. 7, with a corresponding number of projections *d* and warp thread eyes.

I claim as my invention:

1. A circular loom, comprising a frame, warp-thread guides and means for reciprocating the same in combination with shuttles and a race-way therefor on the frame and means whereby the reciprocating thread guides are caused to drive the shuttles through the warp sheds.

2. A circular loom, comprising a frame, warp thread guides and means for reciprocating the same, in combination with shuttles having beveled ends, and a race-way for the shuttles on the frame, the thread guides having projections to act on the said beveled portions of the shuttles to drive the latter with a wedge-like action through the sheds.

3. A circular loom, comprising a frame, warp thread guides having projecting heads and rotary cams to reciprocate the threaded guides, in combination with shuttles and a race-way therefor on the frame, the shuttles having beveled portions to be acted on by the projecting heads of the guides to drive the shuttles through the sheds.

4. A circular loom, comprising a frame and rotary cams, a slotted cylinder and warp thread guides in the slots of the cylinder to be acted on by the cams in combination with shuttles having beveled portions, projections on the cylinder between the slots to form a race-way for the shuttles and projections on the guides to act upon the beveled portions of the shuttles to drive them through the sheds.

5. A circular loom, comprising a frame, warp thread bobbins, warp thread guides and means for reciprocating the guides to form the sheds, in combination with shuttles, means for driving the latter, reciprocating thread eyes for the warp threads and curved guides for said reciprocating warp thread eyes, as and for the purpose described.

6. A circular loom, comprising a frame, warp thread bobbins, warp thread guides and means for reciprocating the guides to form the sheds, in combination with shuttles, means for driving the latter, and means for securing uniform tension of the warp threads, said means including a fixed thread eye, a thread eye reciprocating with the warp thread guide and a curved guide for said reciprocating eye, as and for the purpose described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses.

ABRAHAM E. CHERNACK.

Witnesses:

EDWARD N. GODING,

WM. B. POOR.