

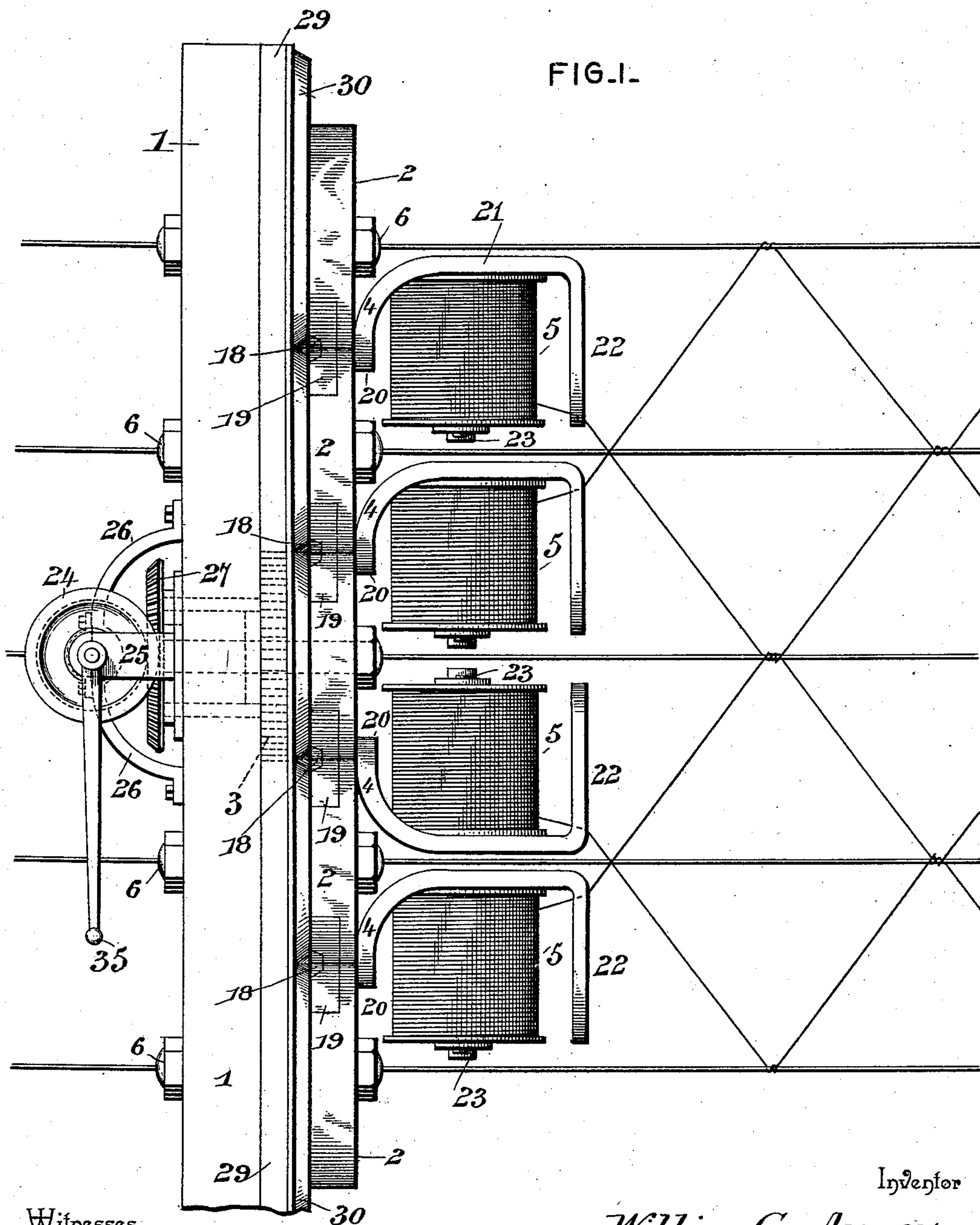
(No Model.)

3 Sheets—Sheet 1.

W. C. AVERY.
WIRE FABRIC MACHINE.

No. 571,079.

Patented Nov. 10, 1896.



Inventor

William C. Avery

By His Attorneys,

C. A. Snow & Co.

Witnesses

Jas. K. McCathum
U. B. Hillyard.

(No Model.)

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FIG. 2.

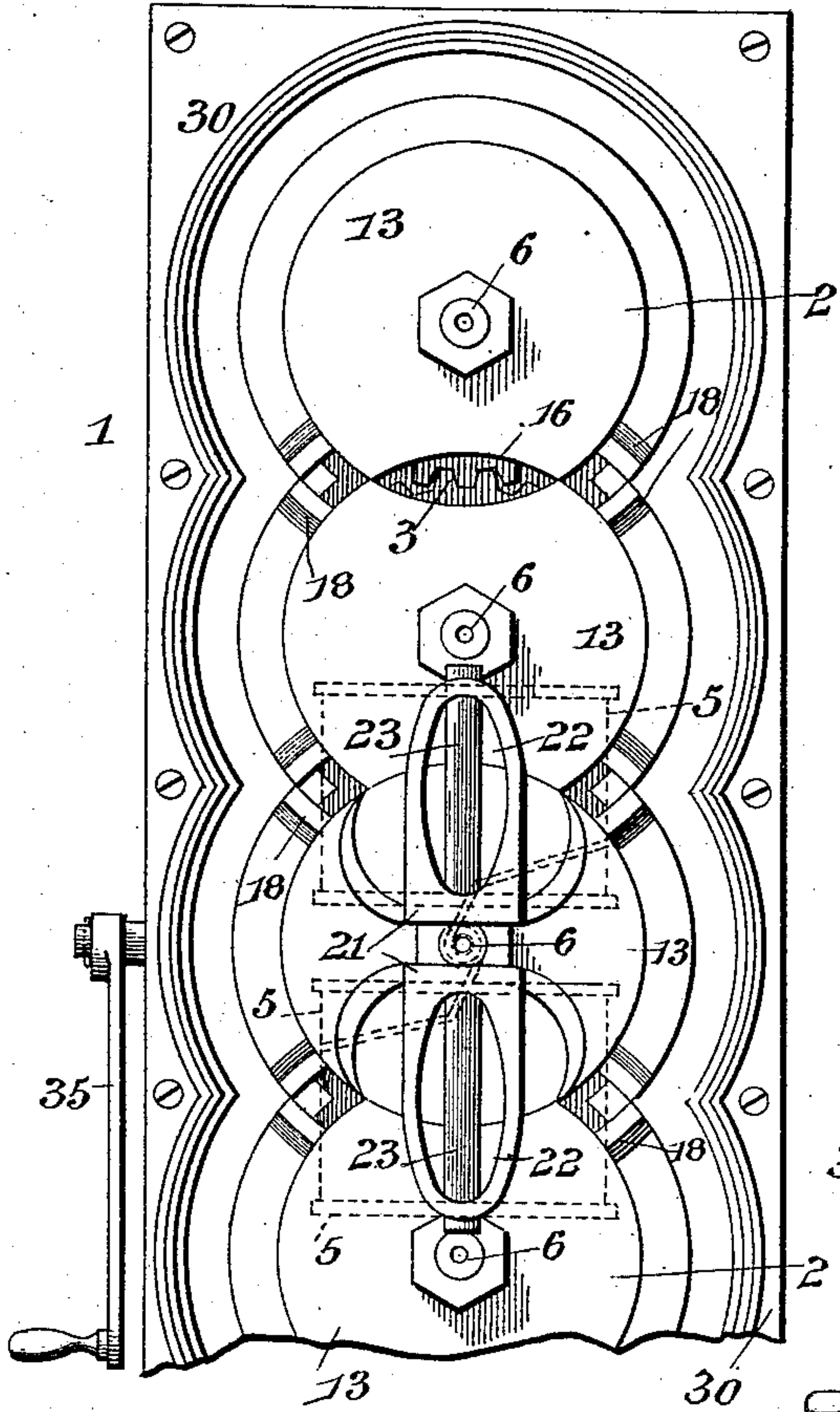


FIG. 3.

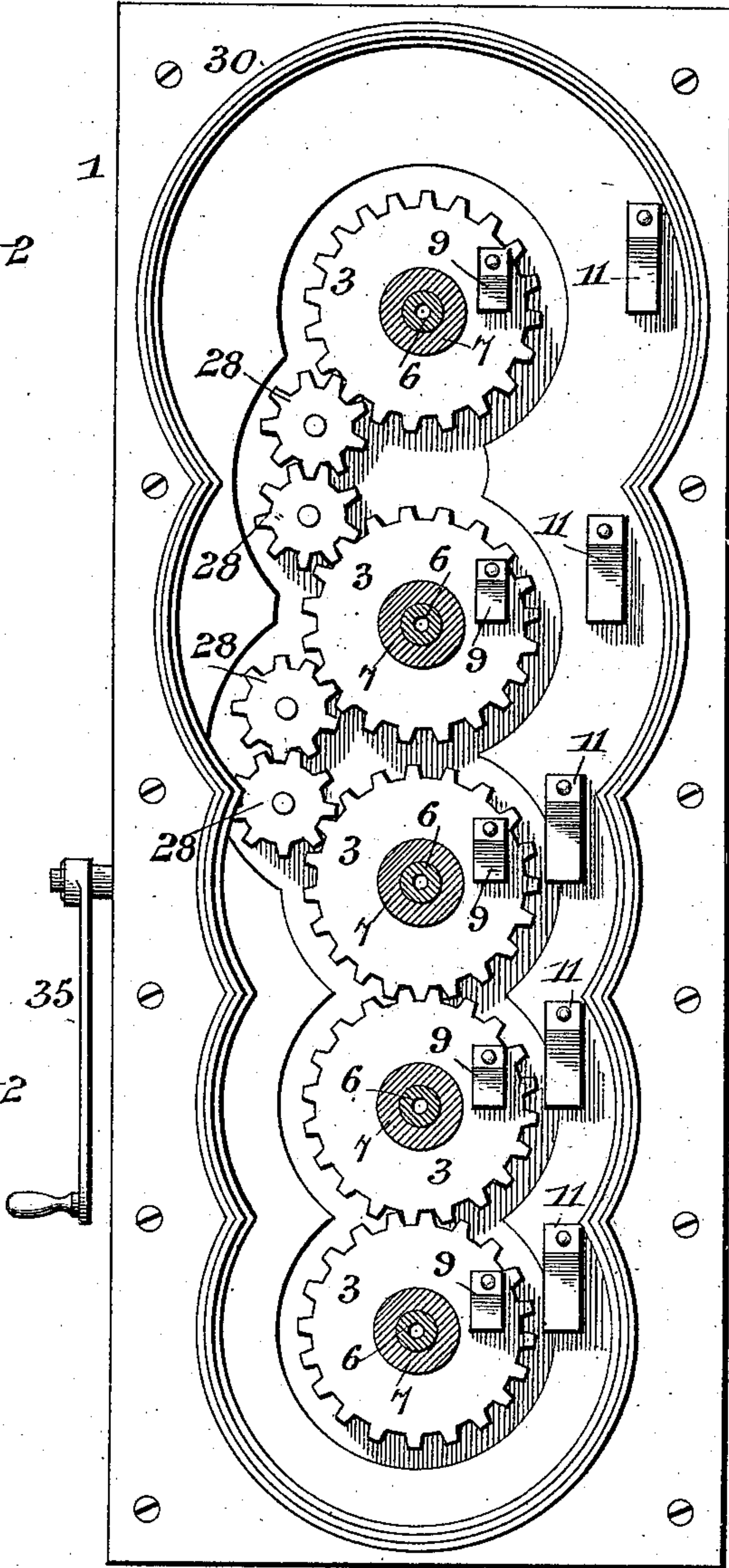
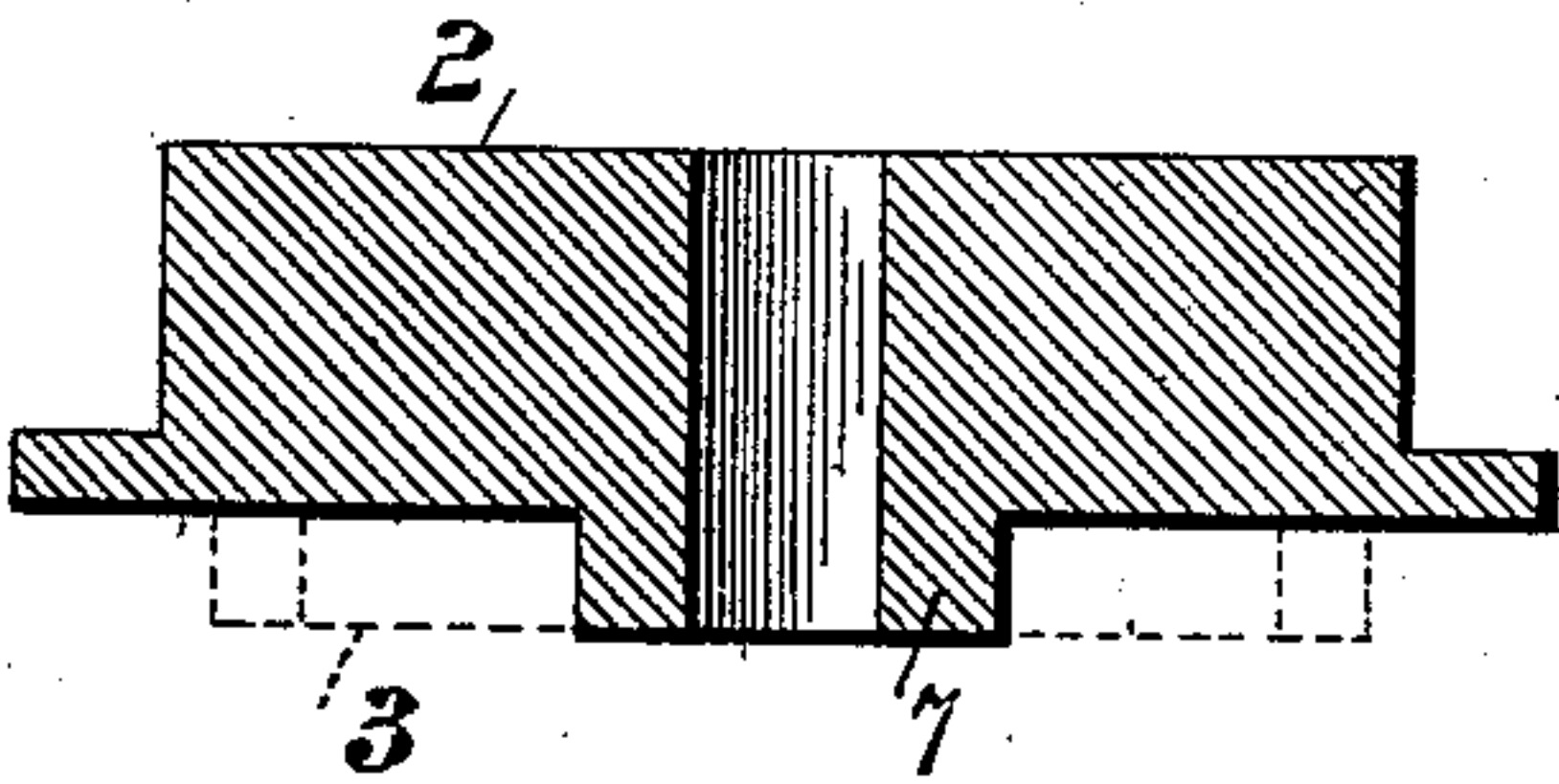


FIG. 6.



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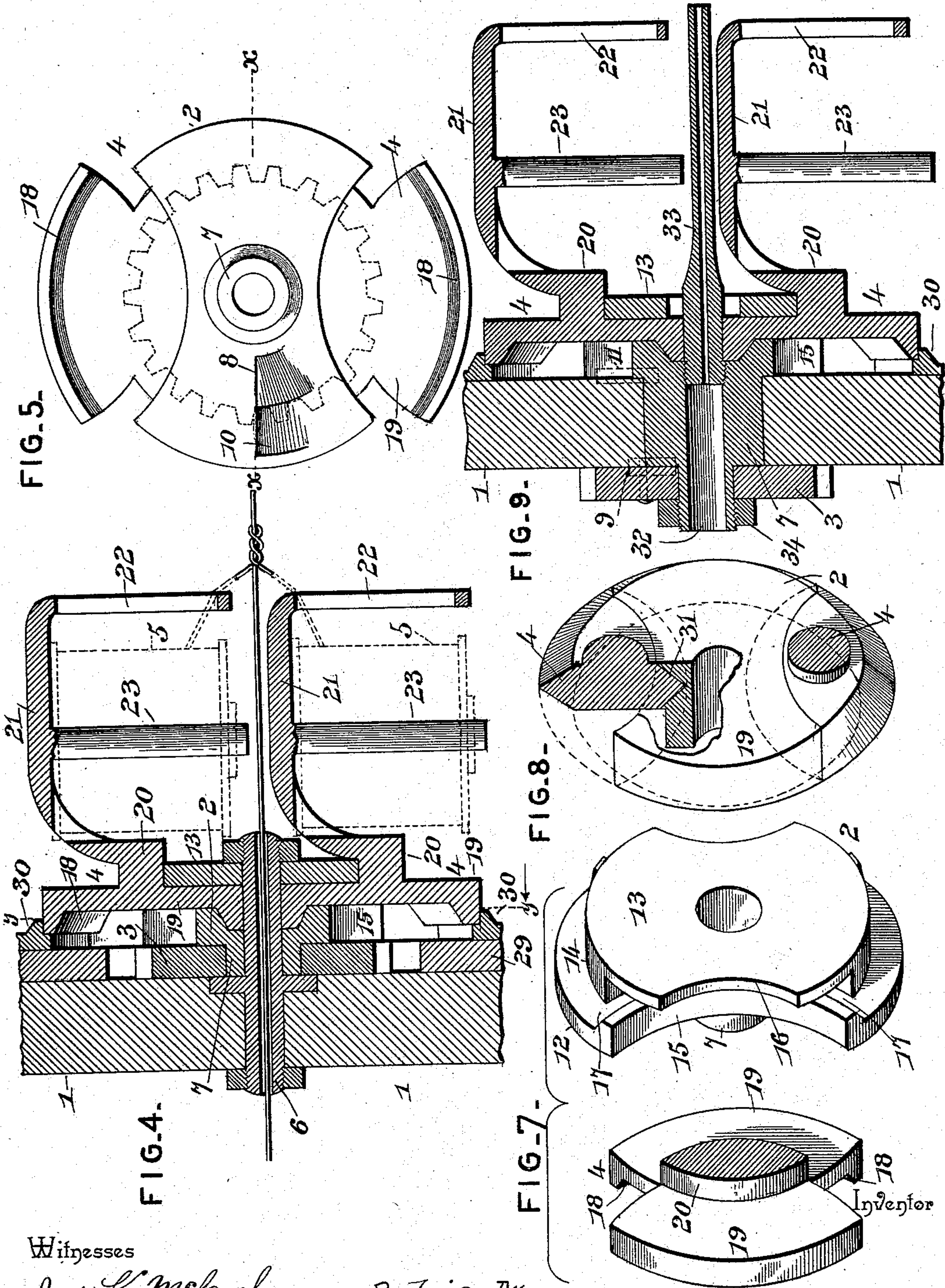
(No Model.)

3 Sheets—Sheet 3.

W. C. AVERY.
WIRE FABRIC MACHINE.

No. 571,079.

Patented Nov. 10, 1896.



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UNITED STATES PATENT OFFICE.

WILLIAM C. AVERY, OF SPRINGFIELD, MISSOURI, ASSIGNOR OF ONE-THIRD
TO WILLIAM A. COX, OF SAME PLACE.

WIRE-FABRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 571,079, dated November 10, 1896.

Application filed December 23, 1895. Serial No. 573,096. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM C. AVERY, a citizen of the United States, residing at Springfield, in the county of Greene and State of Missouri, have invented a new and useful Wire-Fabric Machine, of which the following is a specification.

This invention relates to fence-weaving machinery of that class known as "rotary" woven-wire-fabric machines, and which are used in the manufacture of fencing or netting in the open field or in the factory, and may be applied to machines for making regular or irregular meshed fabric or fencing.

The primary purpose of the invention is to use only essential parts in the operation of twisting the filling or weft wires and to shift the spools or bobbins of wire from one center of rotation to another in the operation of the machine without care or attention on the part of the operator or attendant.

Other objects and advantages, such as pertain to the nature of the invention, will become apparent as the character of the improvement is understood; and to this end the improvement consists in certain details, novel features, and combinations of the parts which hereinafter will be more particularly set forth, illustrated, and claimed.

In the accompanying drawings is illustrated an embodiment of the invention, although various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention, and in said drawings—

Figure 1 is a side elevation of a machine, showing it applied and in operation. Fig. 2 is a rear view of the upper portion thereof, the topmost spool-carrier being removed. Fig. 3 is a vertical section of the complete machine, arranged for weaving fabric or fencing with irregular meshes, on the line Y Y of Fig. 4, looking in the direction of the arrow. Fig. 4 is a plan section of the machine on a line passing through the center of a twister-disk, showing the attendant spool-carriers in a position of one-quarter of a revolution. Fig. 5 is a rear view of a twister-disk, show-

ing by dotted lines the relative position of an actuating gear-wheel. Fig. 6 is a section on the line X X of Fig. 5. Fig. 7 is a perspective view of a twister-disk and the butt portion of a spool-support, the latter being separated from the twister-disk and disposed opposite the space therein which it will occupy when rotating with the said twister-disk. Fig. 8 shows a different manner of grooving the twister-disks for receiving the butts of the spool-carriers, also the peripheral edge portion of the twister-disks and spool-carrier butts oppositely inclining. Fig. 9 is a view similar to Fig. 4, showing a different arrangement and manner of mounting the parts.

The same reference-numerals indicate corresponding and like parts in all the figures of the drawings, in which—

1 denotes the frame or base of the machine, to which are attached the operating parts; 2, the twister-disks; 3, the individual gear-wheels of the train of gearing, and 4 the spool-carriers which support the spools or bobbins of wire 5 for forming the meshes of the netting or fabric or for filling the spaces between the longitudinal or warp wires of the fabric.

The frame is provided at intervals in its length with hollow or centrally-bored spindles 6, upon which are mounted the twister-disks 2, the latter having hub portions 7 projecting from their inner sides to form tubular bearings for the gear-wheels 3. A notch or tooth 8 is formed in the rear side of each twister-disk, to be engaged by means of a corresponding ratchet 9, attached to the adjacent gear-wheel, 3 for the purpose of rotating the parts in unison. A notch or tooth 10 is provided in the twister-disks adjacent to the notch or tooth 8, to be engaged by a detent 11, attached to the frame, so as to hold the twister-disks from rotation and the twister-disks of each series in alinement. Each twister-disk comprises plates 12 and 13, disposed in parallelism and connected by an intermediate portion 14, and these plates 12 and 13 have segmental notches 15 and 16, formed in their respective edges at diametrically opposite points. Grooves 17 are formed in the inner face of the plate 12, contiguous

to and parallel with the segmental notch 15, so as to interlock with a corresponding flange 18 of the spool-carrier.

The spool-carriers comprise segmental butt-pieces 19, having the curved flanges 18 on their rear sides, a neck 20, a frame 21, an eye 22, and a spindle 23, upon which latter is mounted the spool or bobbin of wire 5. The butt-pieces 19 correspond with the segmental notch 15 and fill the latter and complete the circular form of the plate 12, and the neck 20 fits within the segmental notch 16 and completes the circular form of the plate 13. This position of the spool-carrier occurs only when the spool-carrier and notches 15 and 16 are in register.

In machines designed for making meshes of regular size the gear-wheels 3 are of a uniform size and similarly toothed, thereby admitting of the weft or filling wires being similarly twisted together and about the line or warp wires, and these gear-wheels 3 inter-mesh, so that motion being imparted to one will be transmitted to each gear-wheel of the train of gearing or series. The train of gearing may be operated in any convenient manner, and as shown a crank 35 is attached to the journal of a gear-wheel 24, supported by brackets 25 and 26, attached to the frame 1 and meshing with a gear-wheel 27, suitably connected with one of the gear-wheels 3. For providing a fabric or fence having irregular meshes the twister-disks and their attendant gear-wheels are spaced at unequal distances apart and the adjacent gear-wheels are connected together by any form of gearing, such as the idle-pinions 28. (Shown most clearly in Fig. 3.)

A plate 29 is firmly attached to the rear side of the frame 1 and is provided with a frame 30, in which are mounted the twister-disks, and which retains in working position the spool-carriers as the latter rotate with the respective twister-disks.

When the machine is in alinement, the butt-pieces of the spool-carriers will lie in the spaces formed by the segmental notches 15 and 16 in the contiguous edges of the adjacent twister-disks. The purpose of the twister-disks is to rotate and carry the spool-supports during the operation of forming a row of twists; also, to serve as guides during the succeeding operation of the machine. The twister-disks are disposed so as to form two sets or series having opposite periods of rotation and rest, but both sets or series are at all times confined to rotation in one and the same direction. The twister-disks of one set or series alternate with the twister-disks of the opposite set or series, and the actuating and detent mechanisms of one set are so placed that all of the twister-disks of one series will either rotate or be in a state of rest and so that only one set of twister-disks will be in operation at a time, the other set or series being stationary. The driving and detent

devices are placed in such relation that upon rotating the actuating-train of gearing in one direction only one set of twister-disks will be operated, the other set remaining stationary and forming guides for the rotating series, and upon reversing the movement of the actuating mechanism the series or set of twister-disks previously in motion will become stationary and those at rest prior to reversing the movement will be operated. This operation is plain when it is remembered that the notches of the twister-disks are oppositely disposed, *i. e.*, the notches in one set of disks facing in one direction to be engaged by the ratchets 9 of one series of gear-wheels and the notches in the other set of disks facing in an opposite direction and to be engaged by the ratchets of the other series of gear-wheels. The gear-wheels are arranged so that the intermediate ones rotate in the same direction and opposite to the alternate gear-wheels. Hence when one set of gear-wheels are actuating a series of twister-disks the other set have their ratchets riding upon the corresponding twister-disks without imparting any movement thereto.

During the alinement of the machine the butt-pieces of the spool-carriers are directly between the notched portions of the adjacent twister-disks, as previously intimated, and project into the body-grooves thereof. At this point the spool-carriers have two possible points of rotation, either one of which they may be made to rotate around by operating the actuating mechanism in the desired direction. The rotating series or set of twister-disks engage with the flanges 18 of the butts of the spool-carriers and rotate the latter therewith, forming a row of twists in the fabric, and during this operation the opposite set or series of twister-disks, which are stationary, act in conjunction with the frame 30 to form guides for the spool-carrier butts of the active twister-disks.

Turning the crank 35 in either direction at the alinement of the machine produces a twist of the filling-wires. Should the crank be turned continuously in the same direction, the twists of the filling or weft wires would be continuous and about the same warp or longitudinal wires, but by reversing the motion of the crank 35 at the proper time, that is, when the machine is in alinement, the spool-carriers will be caused to rotate around different centers, thereby twisting the filling-wires about different warp-wires. Thus by reversing the motion of the crank after each advance of the machine the filling or weft wires will be twisted in alternate relation, thereby producing the desired mesh.

For convenience in moving the machine over the ground it will be supported in any of the usual ways common to apparatus of this character, and it will be advanced in any convenient manner so as to form the desired mesh. These provisions are common and

well known and need not be illustrated or referred to in detail, and are omitted for the sake of clearness and perspicuity.

In the modification shown in Fig. 8 the grooves 31 corresponding to the grooves 17 are V-shaped and are formed in the intermediate portion 14 instead of in the plate 12, and the edge portion of the segmental butt-pieces 19 is correspondingly shaped to fit snugly within the groove 31. The peripheral edge portion of the twister-disks is oppositely beveled to an edge, and when using twister-disks of this form the frame 30 will have its inner side shaped to correspond with the peripheral edge portion of the twister-disks.

In the modification shown in Fig. 9 fewer parts are required. Hence the expense of constructing the machine is reduced and a better arrangement is attained for attaching and applying the driving mechanism. The hub 7 of the twister-disk is extended so as to project through the frame 1, and obtains a bearing therein, and a portion, as 32, projects beyond the front side of the frame and is reduced, and the gear-wheel 3 is mounted thereon, being held in place by a nut 34, mounted upon the projected threaded end of the part 32. The driving-ratchet 9 is placed between the gear-wheel 3 and the hub 7 near the front side of the frame, and the detent 11 is placed in a similar manner to the previously-described arrangement. For twisting the filling or weft wires about the warp-wires a tube, as 33, is provided and screws into the hub portion 7 of the twister-disk. It will be understood that when the completed fabric is not required to have warp-wires the latter will be dispensed with, the filling or weft wires being twisted together in alternate relation, forming the required mesh. When constructing a fabric or fencing having warp-wires, the latter will pass through the hollow or centrally-bored spindles 6 or the tubes 33 and the filling or weft wires will be twisted therearound and together at the points of intersection.

When the machine is constructed for forming fabric or fencing having irregular meshes, as shown most clearly in Fig. 3, the twister-disks will be so placed as to attain the desired end, and each may have notches 15 and 16, of different size and radius, on opposite sides, but the radial point of all of said segmental notches and also the grooves 17 parallel thereto on either side of any of the twister-disks will clearly be seen to be the center of rotation of the adjacent twister-disk on that side when in alinement.

It will be understood that when the machine is in alinement the notches in the twister-disks of the two sets or series will come in the same straight line, so that upon rotating the twister-disks of one set or the other the spool-carriers will move with the set of twister-disks having motion imparted thereto, the opposite set of twister-disks remaining stationary and forming guides, as previously explained.

Having thus described the invention, what is claimed as new is—

1. In a machine for weaving wire fabric or fencing, the combination with a series of twister-disks having segmental notches at diametrically opposite points, and actuating mechanism for operating the alternate and intermediate twister-disks alternately, of spool-carriers arranged between the twister-disks and having segmental butt-pieces to fit within the segmental notches of adjacent twister-disks and interlock with the latter when the machine is in alinement, substantially as set forth for the purpose described.

2. In a machine for weaving wire fabric or fencing, the combination of a series of twister-disks, each having segmental notches disposed at diametrically opposite points, and having grooves extending parallel with the segmental notches, actuating mechanism for alternately operating the intermediate and alternate twister-disks, and spool-carriers having segmental butt-pieces to enter the segmental notches of adjacent twister-disks and capable of rotating with either, and having the peripheral edge portions of the said butt-pieces interlocking with the grooves extending parallel with the segmental notches of the twister-disks, substantially as set forth for the purpose described.

3. In combination, a series of twister-disks, spool-carriers operated thereby, a train of gearing, ratchets carried by the individual gear-wheels of the train of gearing for driving the intermediate and alternate twister-disks at different periods, and detents disposed to engage with the alternate twister-disks and hold them stationary during the active period of the intermediate twister-disks, and vice versa, substantially as set forth.

4. In a machine for weaving wire fabric or fencing, the combination with a series of twister-disks, and actuating mechanism therefor, each twister-disk comprising plates disposed in different planes and in parallel relation, and having an intermediate connecting portion, the plates having segmental notches at diametrically opposite points, of spool-carriers comprising segmental butt-pieces disposed in different relative planes and corresponding with and filling the segmental notches in the inner plates of the twister-disks, and neck portions of corresponding shape to and filling the segmental notches in the outer plates, substantially as set forth for the purpose described.

5. A machine of the character and for the purpose set forth, comprising a frame, a series of twister-disks journaled at intervals in the length of the frame, each having segmental notches at diametrically opposite points, a train of gearing, driving ratchets and detents disposed to operate at the same period upon the alternate and the intermediate twister-disks, whereby when the alternate twister-disks are in active operation the intermediate twister-disks are stationary, and vice

versa, and spool-carriers having segmental butt-pieces to enter the segmental notches of adjacent twister-disks when the machine is in alinement, and capable of two possible centers of rotation, substantially in the manner set forth for the purpose described.

6. In a machine for weaving wire fabric or fencing, the combination of a series of spool-carriers, and a series of intermediate twister-disks, the parts being in alinement and disposed to form a fabric or fencing of regular or irregular mesh, each twister-disk having segmental notches 15 and 16 and grooves 17 parallel therewith, the radial point of all of the notches and grooves on any side of either twister-disk being the center of rotation of the adjacent twister-disk on that side when in alinement, the notches 15 and 16 and the grooves 17 of the stationary twister-disks acting as guides to the adjacent rotating parts and combining and interlocking with the adjacent parts when actuated or rotated, substantially as set forth.

7. In a machine for weaving wire fabric or fencing, the combination of a series of twister-disks arranged in a straight line, each having segmental notches and corresponding grooves in its opposite sides, spool-carriers arranged between the twister-disks and having butt-pieces to enter and fill the segmental notches in the sides of adjacent twister-disks when the spool-carriers and said notches are in alinement, and mechanism for rotating each alternate twister-disk simultaneously to operate the spool-carriers, the intermediate twister-disks forming guides for the rotating elements, substantially in the manner set forth for the purpose described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM C. AVERY.

Witnesses:

WM. A. REED,
H. C. GARLECK.