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I. SEDGWICK.

Wire-Twister.

No. 218,323. **Patented Aug. 5, 1879.**

Fig. 1.

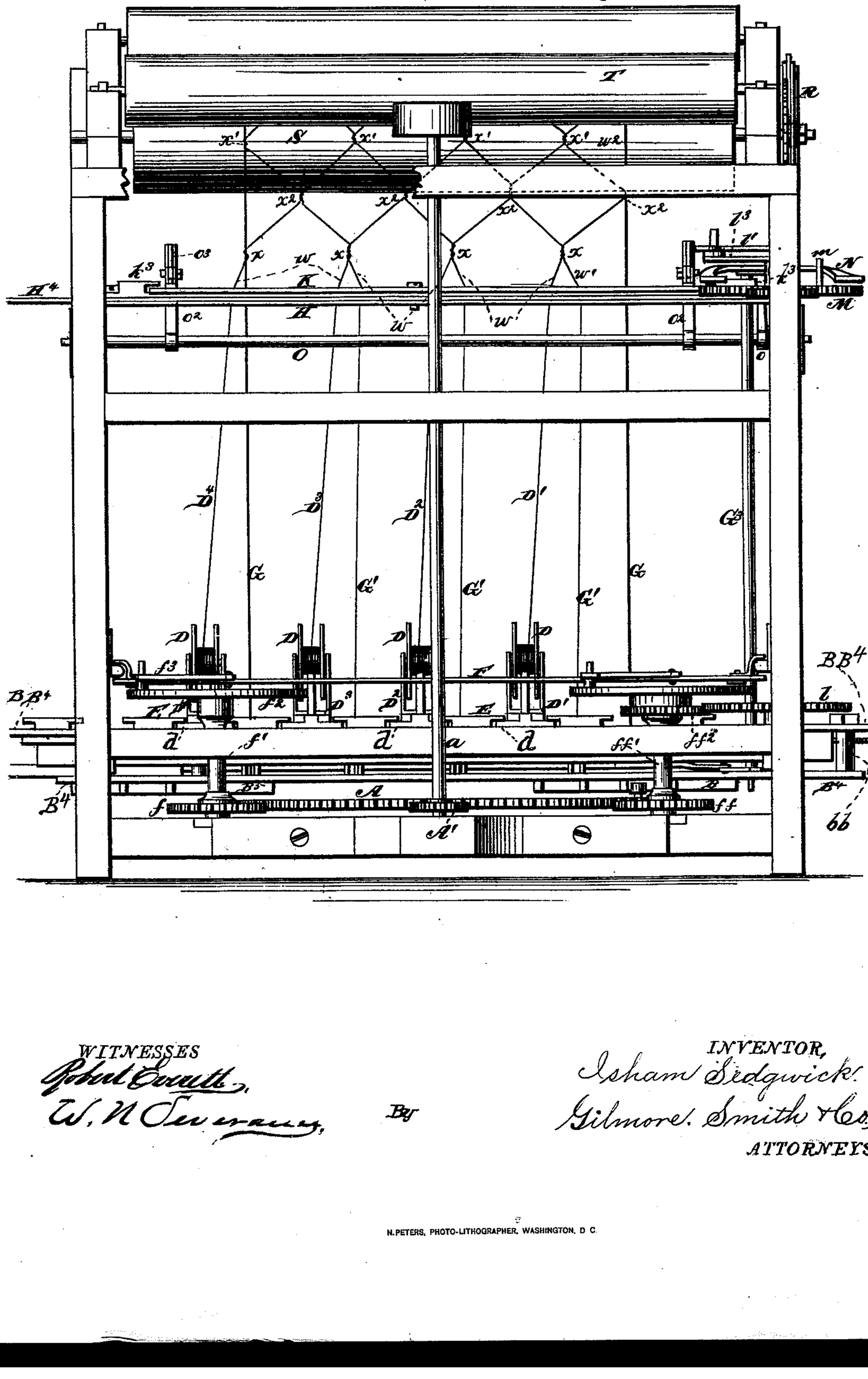

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Fig. 2.

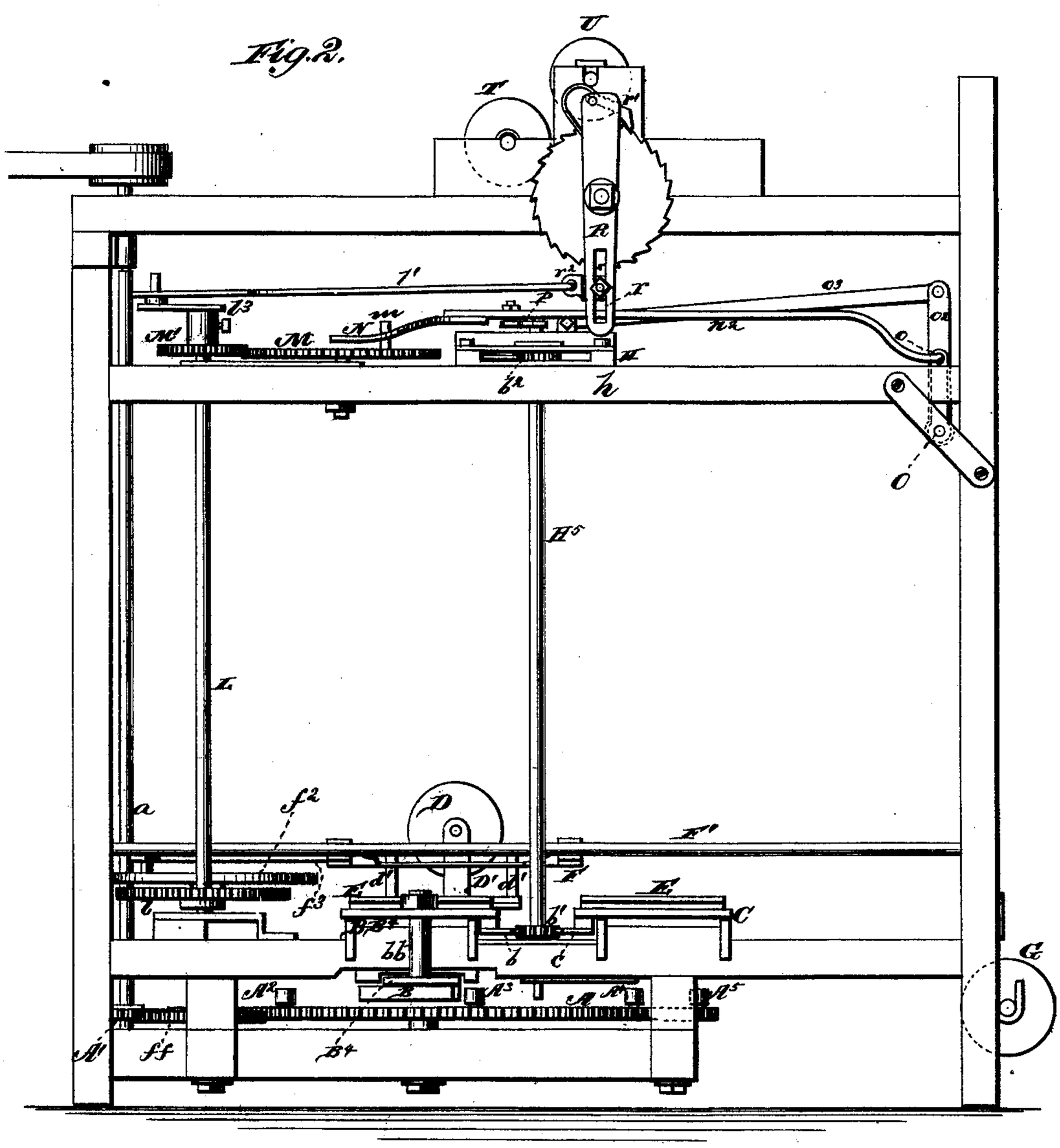

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Fig. 3.

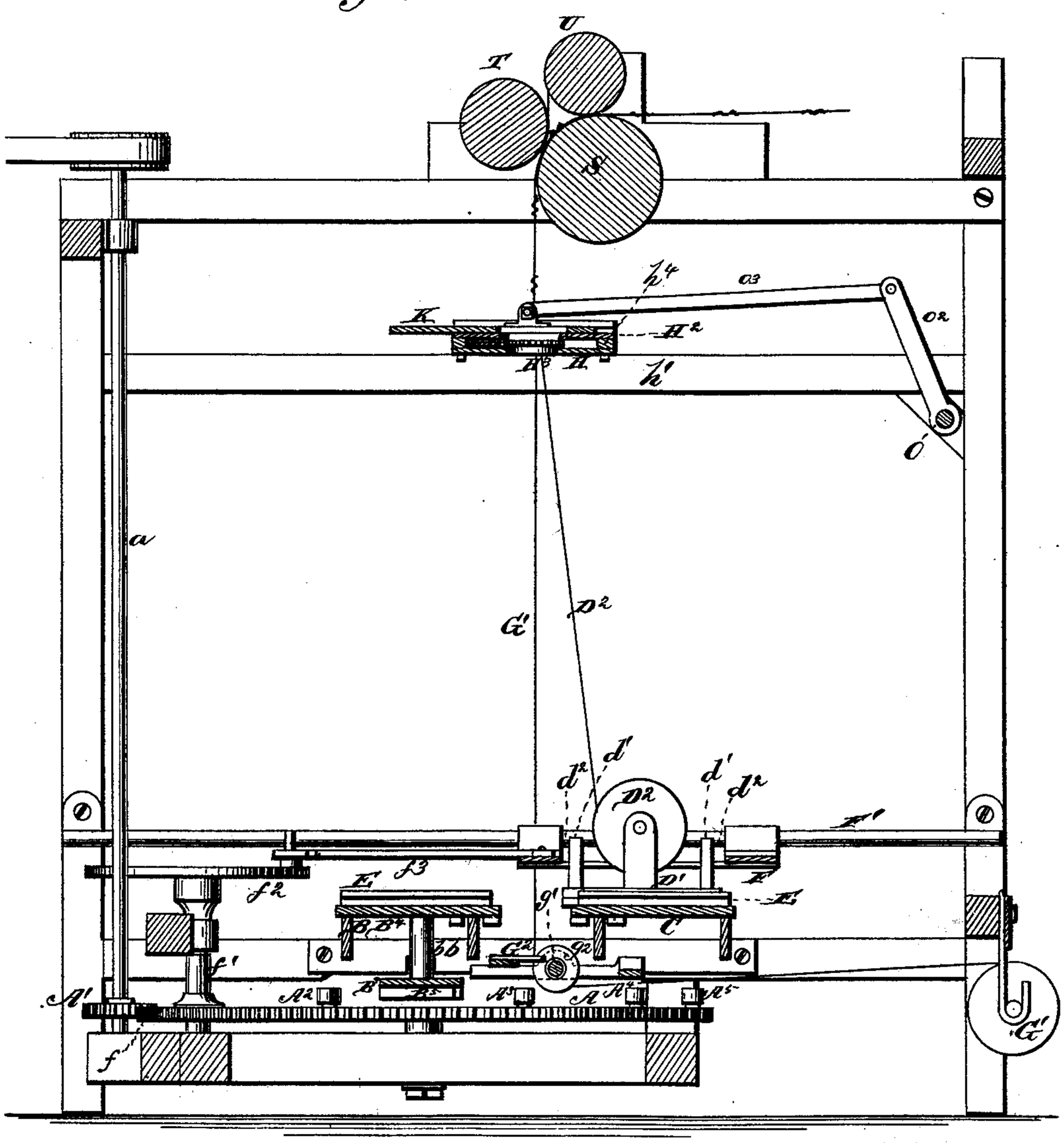

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Fig. 4.

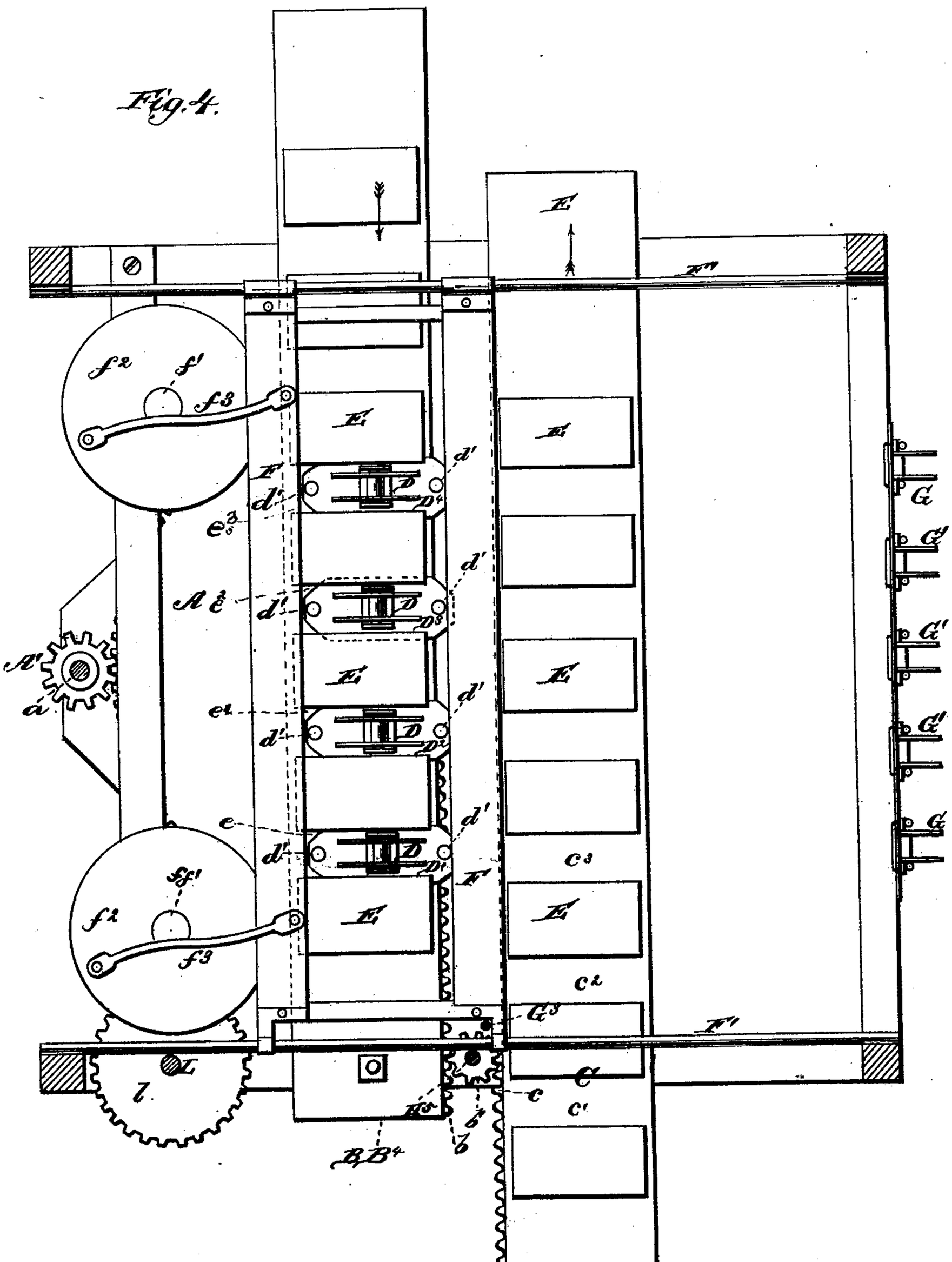

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Fig. 5

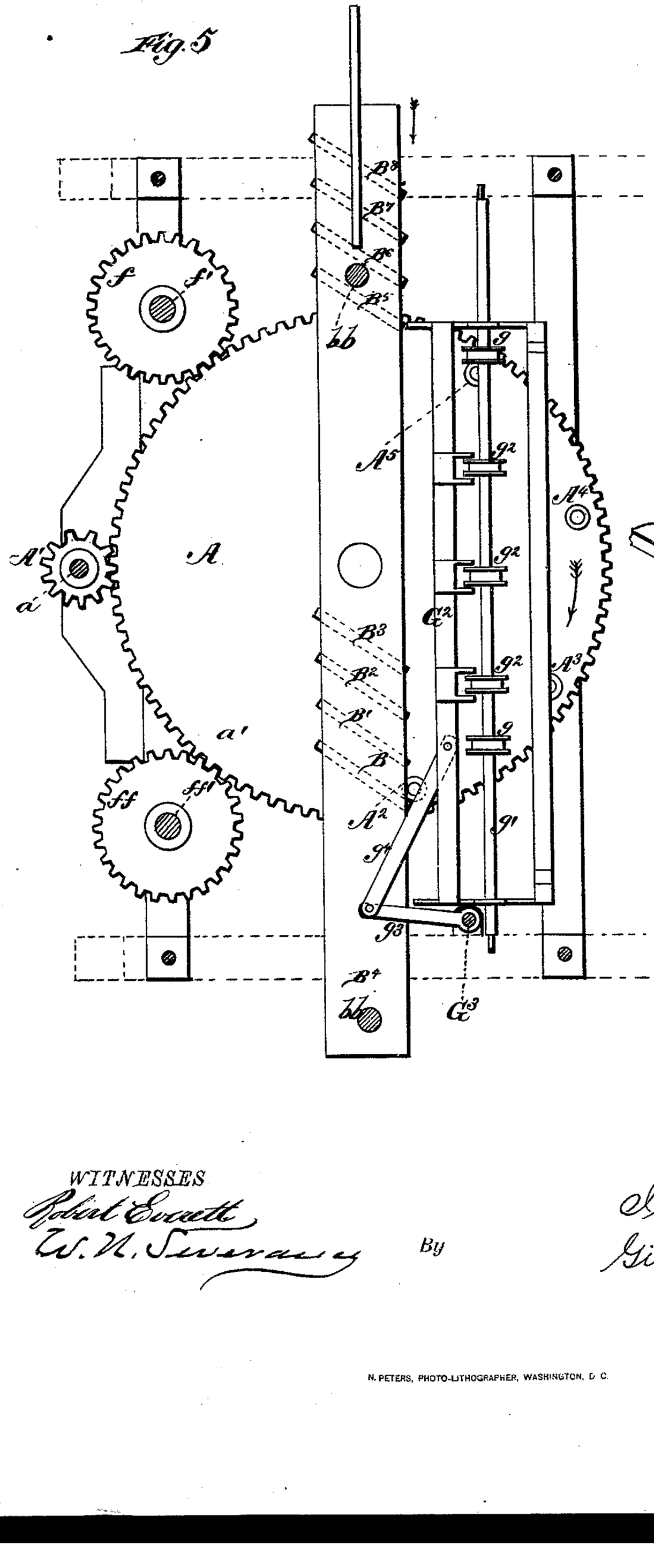
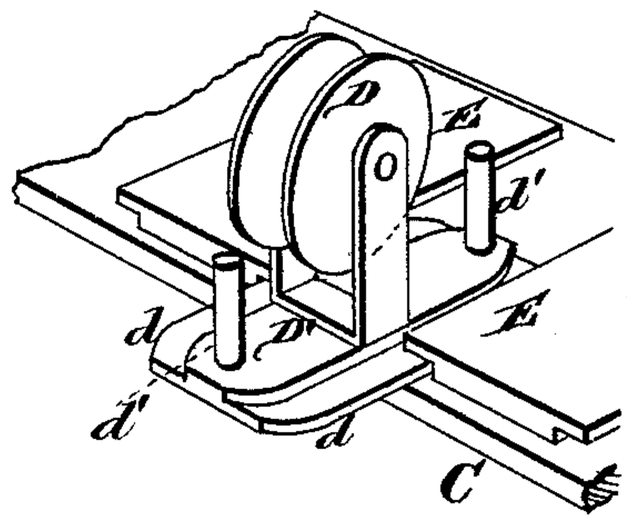


Fig. 6



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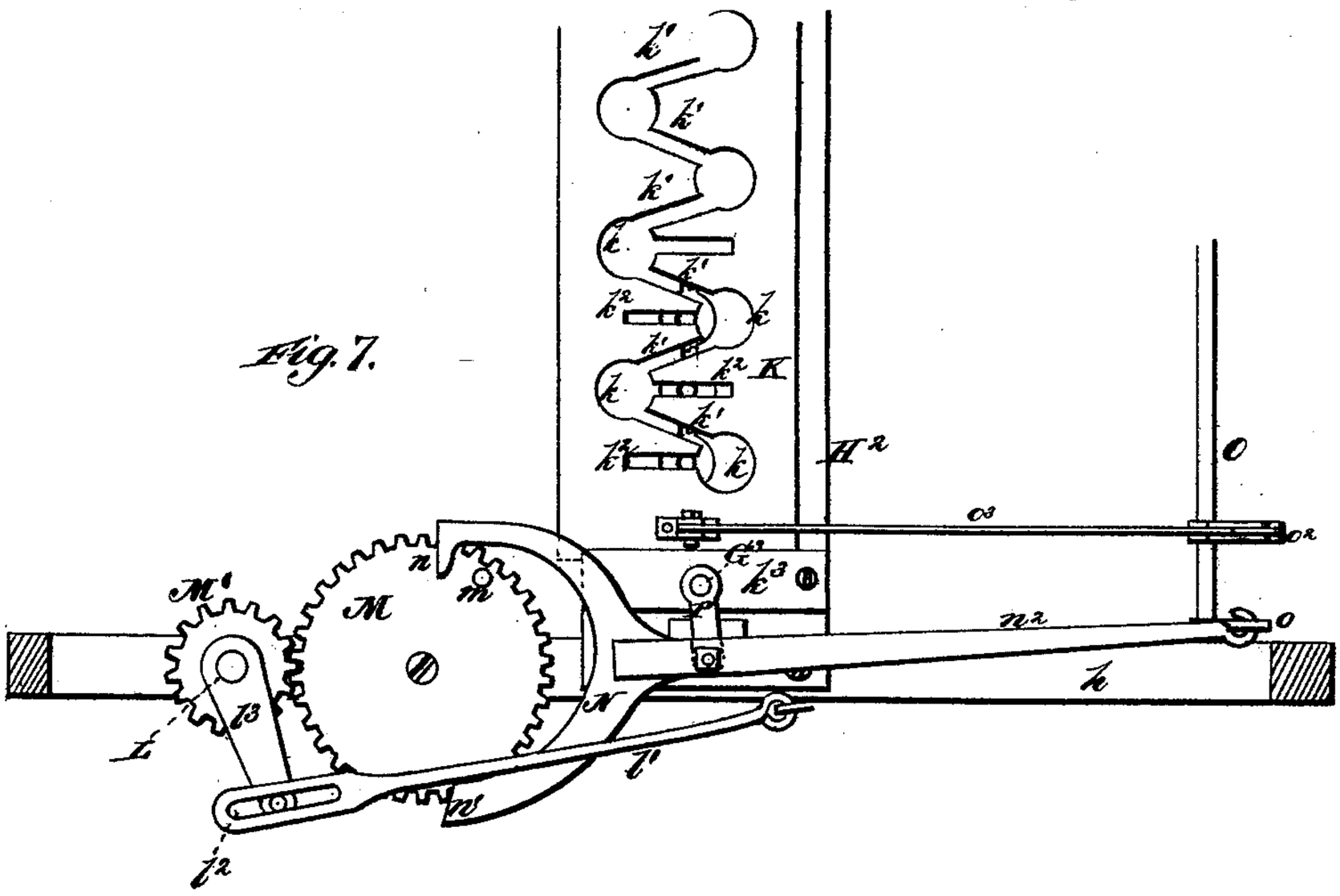

Fig. 7.

Fig. 8.

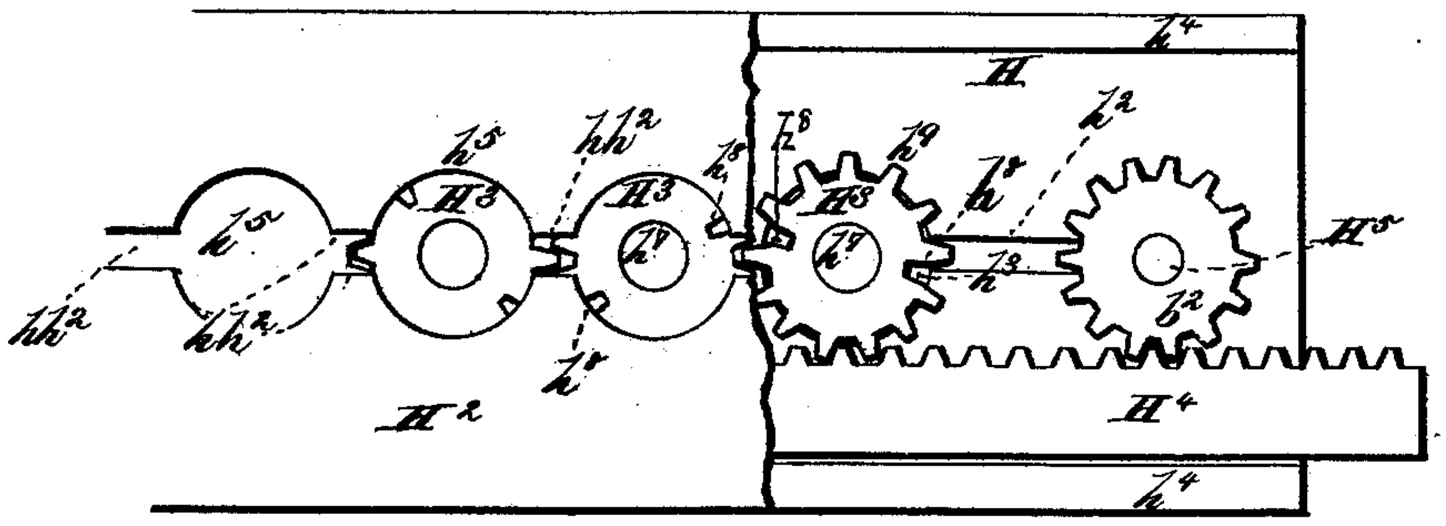

Fig. 9.

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UNITED STATES PATENT OFFICE.

ISHAM SEDGWICK, OF TRENTON, INDIANA.

IMPROVEMENT IN WIRE-TWISTERS.

Specification forming part of Letters Patent No. **218,323**, dated August 5, 1879; application filed April 5, 1879.

To all whom it may concern:

Be it known that I, ISHAM SEDGWICK, of Trenton, in the county of Randolph and State of Indiana, have invented certain new and useful Improvements in Machines for Making Twisted-Wire Fabrics; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a front elevation of a machine embodying the improvements in my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical central section, Fig. 4 is a horizontal section, Fig. 5 is a sectional detail view, Fig. 6 is a perspective detail view, Fig. 7 is a sectional detail view, Fig. 8 is a detail view, and Fig. 9 is a sectional detail view, of the invention.

Identical parts in the drawings are designated and referred to by the same letters.

My invention relates to machines for making twisted-wire fabrics; and it consists in the improvements in the construction of the machine, hereinafter fully described, and particularly pointed out in the claims.

Referring to the drawings, A designates the wheel for operating the mechanism, which is preferably driven by the pinion A^1 upon the shaft *a*, which latter should be provided with a fly-wheel to impart a regular motion to the mechanism. A^2, A^3, A^4, and A^5 are lugs, preferably composed of anti-friction sleeves on studs set in the face of the driving-wheel A, and located, as shown in the drawings, to engage with the cams B, B^1, B^2, and B^3 upon the left of the center of the plate B^4, and the cams B^5, B^6, B^7, and B^8 upon the right of the center of the plate B^4, in such a manner as to transmit from the rotary motion of the driving-wheel A to the plate B^4 a compound intermitting reciprocating motion, described more fully as follows, viz.: When the plate B^4 is in its extreme left-hand position, as shown in Fig. 5, the lug A^2 engages the cam B, and the driving-wheel A, continuing to revolve in the direction indicated by the arrow, causes the plate B^4 to be moved to the right a distance made positive and uniform by the fixed inclination of the cams. The plate B^4 then remains at rest in that position until moved in a similar manner by the lug A^3 engaging the cam B^1. The plate B^4 is again at rest until moved in the same direction by the action of the lug A^4 and cam B^2, when it is again at rest until it is a fourth time moved to the right, thus providing a compound intermittent motion of this plate B^4 to the right. In like manner, the same lugs A^2, A^3, A^4, and A^5 consecutively engage the cams B^5, B^6, B^7, and B^8, and cause an intermittent motion, or, rather, a series of intermittent motions, which returns the plate B^4 to its original position at the left, as described, thus producing a reciprocating motion by means of a series of intermittent motions in each direction. The plate B^4 is rigidly connected to the plate B B^4 by means of the stud *b b*.

C (see Fig. 2) is a companion plate of B B^4, and is placed in operative connection with it by means of the rack *b* on B B^4, the pinion b^1, and the rack *c* on plate C.

D are spools for storing and carrying wire intended to enter into the construction of the fabric. These spools are supported and carried in proper places by spool-carriers D^1 D^2 D^3 D^4, which are provided with the flanges *d* and the drivers *d'*.

E are flanged plates, which are attached to the plates B, B^4, and C, and so constructed and arranged that the spool-carrier D^1 will slide freely between them longitudinally, and be rigidly held in position vertically.

The plate B B^4 being in the left position, as before described, and the rack *c* of the plate C being engaged with the pinion b^1, so as to place the spool-carrier D^1, situated in channel *e* (see Fig. 4) of plate B B^4, opposite to the channel c^3 of plate C at a time in the motion of the machine when the driving-rack F, traveling upon the ways F^1 and operated by the pinions *f f f*, shaft f^1 f^1 f^1, crank f^2, and connecting-rod f^3, engages the driver *d'*, and forces D^1 into the channel c^3 of plate C, plate B B^4 is moved, by one of the cams and lugs before described, to the right, and plate C, by the pinion and racks, is moved to the left, as described, which reverse intermittent motions are sufficient to place channel e^1 of plate B B^4 opposite channel c^3 of plate C, when

the driving-rack F engages the drivers d', and forces the spool-carrier D^1 into channel e^1 of the plate B B^4.

By a similar motion of the driving-wheel the carrier D^1 is placed in the third or e^2 channel of the plate B B^4. The motions of this carrier D^1 during these motions are, first, a longitudinal motion from channel e of plate B B^4 to channel e^3 of plate C; second, thence to the left, or a latitudinal motion to the left; third, thence longitudinally from e^3 to channel e^1; fourth, thence by the motion of the plate B B^4 longitudinally to the right, thus completing the transfer of D^1 around a rectangular path to its place of starting; fifth, thence again longitudinally from e^1 to e^2; sixth, thence again latitudinally to the left; seventh, thence from e^2 to e^2; eighth, thence again a latitudinal motion to the right, completing the second revolution to the left of D^1; ninth, thence from e^2 to e^1; tenth, thence latitudinally to the right; eleventh, thence from e^1 to e^1; twelfth, thence latitudinally to the left; thirteenth, thence from e^1 into e^2; fourteenth, thence to the right; fifteenth, thence from e^2 to e; thence left to the original position, thus completing two revolutions of D^1 to the right.

The outer wire-carriers, D^2 D^3 D^4, pass through motions identical with those described of the carrier D^1, which, in the aggregate, consist of two revolutions or circuits to the left by four right-angled motions for each revolution or circuit, and two revolutions or circuits to the right by four right-angled motions to each revolution or circuit.

G G are stationary spools on a frame for storing the edge-wires. G^1 G^1 G^1 are spools for storing a part of the wire for forming the meshes of the fabric. There are (see Figs. 3 and 5) stationary pulleys g on the shaft g^1, and g^2 are movable pulleys on the same shaft. These pulleys are for guiding the wires and shifting the position of the wires on the movable pulleys, to better enable the wires attached to and extending from the spools on the spool-carriers to be carried around the wires extending upward from the pulleys g and g^2. These movable pulleys g^2 are shifted by means of the rack G^2 and crank g^3 and connecting-rod g^4, operated by the shaft G^3. This rack shifts the movable pulleys to the right simultaneously with the first longitudinal motion of the carrier D^1, so as to lessen the longitudinal motion required to pass the carriers D^1, &c., around the wires G^1, and returns them to their original position on the ninth movement before described.

H is a plate extending from h to h^1, which are transverse beams of the frame. This plate is provided with a series of circular holes, h^3, which are adapted to receive the twisters H^3 H^3, shouldered, as shown in Fig. 9. These holes are connected by means of the slots h^2.

H^2 is the top plate or companion plate of H, and is provided with slots h h^2 and circular holes h^5. The plate H^2 is held at a distance above the plate H by means of the interposed strips or webs h^4. The holes h^5 and slots h^2 are located above those of the plate H. The webs h^4 form the slot or space h^6 between H and H^2.

H^3 are the disks which twist the wire into meshes, provided with the open centers or eyes h^7, the notches h^8 in their peripheries, the teeth h^9, and the hubs h^{10}.

H^4 is a rack playing in the space h^6, engaging all of the disks H^3, and revolving them, first, two revolutions to the left, and then two to the right, by the movement of the rack to the right and left, caused by the pinion b^2, shaft H^5, and pinion b^1, simultaneously with the right and left movement of the plate B B^4.

K is a sliding plate, provided with the holes k, inclined slots k^1, and right-angled slots k^2.

k^3 are ways, which are attached to the plate H^2 to serve as guides for the sliding plate K. Slots k^2 are for the edge-wires. These right-angled slots k^2 are immediately above the central openings or eyes of the twisting-disks, and they are located to allow the sliding plate K to move horizontally when the side or edge wires of the fence are passing through the eyes of the twisting-disks.

In case tension-wires running through the fence, but not deflected, be introduced, they would also pass through the eyes of the twisting-disks and play in these slots k^2.

L is a shaft transmitting motion from the driving-wheel A by means of the pinions f f f f^2, shaft f f^1, and pinion l, which connects the crank l^3 of the pinion M and ear r^2 of the lever R.

The connecting-rod l^1 is slotted, as shown at l^2, in such a manner that the crank l^3 operates it but one-half of a sweep.

M is a spur-wheel, carrying the wrist-pin m, driven by the pinion M^1.

N is a bifurcated rod, provided with hook n on one arm, and the face n^1 on the other arm, of the bifurcated end or arm of the rod. Its long arm n^2 engages the arm o of the rocking shaft O. There are longer arms, o^2, attached to the shaft O, which are connected with the sliding plate K by rods o^3.

P is a crank on shaft G^3, which serves as the fulcrum of the bifurcated arm or lever N.

R, Figs. 1 and 2, is the feed-lever, which has an intermittent motion given it by means of the slot l^2 in the connecting-rod l^1. This feed-lever has a slot, r, a pawl, r^1, and an adjustable ear, r^2, by means of which the feed motion given to the feed-rollers may be regulated at will.

S is the feed-roller, and T and U are co-operating feed-rollers, which may be forced upon the roller S in any suitable manner. These rollers T and U also serve the purpose of binding the fabric preparatory to rolling it up for packing.

An additional rack, similar to rack H^4, may be placed, in connection with the toothed disks or twisters H^3, on one side of them, opposite to the rack H^4, and operated by the same pinion, b^2, that operates H^4.

The advantage of such an arrangement of parts is, that these two racks, operating in reverse directions upon opposite sides of the twisters H^3, provide an easier and more positive motion of the parts of the machine.

The operation of the machine is as follows: The two wires G G are the outside or edge wires of the fabric, as shown. These wires pass from their spools of the same letter to the stationary pulleys g g on the shaft g^1, and from there extend upward through the eyes of the twisting-disks vertically above the pulleys g g, and from there they pass between the draw-feed rollers S T U.

The three wires G^1 G^1 G^1 pass from their spools of the same letter over the movable pulleys g^2 on the shaft g^1, and from there vertically upward through the notches upon the right-hand side of alternate ones of the series of twisting-disks H^3, and upward to the feed-rollers.

The wires D^1 D^2 D^3 from the supply-spools, located upon the carriers of the same letters, are passed through the notches upon the opposite or left sides of the same twisting-disks, and then upward under the feed-rollers.

The wire D^4 is passed through the left-hand notch of the twisting-disk, that has the left-hand edge-wire through its center, and then upward between the feed-rollers. This position of the wires is again reached at each alternate twisting in the mesh formation.

The movements of the spool-carriers, hereinbefore described, pass the wires D^1 D^2 D^3 twice around to the left, and around their respective G^1 wires, as shown in Fig. 1, and also passes the D^4 wire twice around the G or edge wire, forming the double twists x^1 x^1 x^1; and then as the carriers are moved to the right, as hereinbefore described, the D^1 wire is passed twice to the right around the right-hand G wire, and the D^2 D^3 D^4 wires are each at the same time and in like manner passed around their respective G^1 wires, forming the double twists x^2 x^2 x^2. Simultaneously with these several motions of the spool-carriers and their wires the twisting-disks have formed the two twistings x^1 and x^2—the first, x, twisted to the left, and the second, x^2, to the right—and the motions of the wires which I have described have prevented any twisting or mesh formation below the plate H.

The holding of the wires in the twisting-disks, and their transfer at the proper time from one disk to another, are accomplished in the following manner, reference being had to Figs. 7, 8, and 9: The wires are passed through the notches h^8 of the twisting-disks. These twisting-disks are constructed with an eye, h^7, through which the edge-wires of the fabric are passed. The twisting-notches h^8 in the peripheries of the disks, where the wires which form the fabric are placed, the teeth h^9, for revolving the disks by the rack H^4, the hub h^{10} of the disk H^3, formed to rest in the holes h^3, and the plate H^2, hold these disks in position, while the edges of the holes h^5 in plate H^2 retain the wires in the notches of the disks while the twisting is being done.

The machine is so constructed and set up that as the plates B, B^4, and C are at rest, the notches h^8 of the twisters are in line with the slots h^2 of the plate H, and for each movement of the plates B, B^4, and C the twisters will be turned one-half of a revolution. After two revolutions to the left of the twisters and spool-carriers at this time, and while the studs A^2 A^5 are passing from the right to the left of the plate B^4, the disks are at rest during this time, and the sliding plate K is actuated by the spur-wheel M and the intermediate mechanism.

The inclined slots k^1, as they pass over the twisting-disks, engage the wires that may be in the notches of the same, carry them over and place them in the notches of the adjacent or intermediate twisting-disk while yet the disks are at rest, and hold the wires in the disks by the edges of the holes k until the twisting-disks revolve, when they are retained by the twisting of the wires.

The twisting is accomplished by placing the wires which are to be twisted together in opposite notches of the same twisting-disk.

As before stated, the wires are first placed in the notches in the opposite sides of each alternate twisting-disk. The series of meshes x^1, Fig. 1, are formed by the same disks that the meshes x are formed by.

The twisting of the meshes x being accomplished, the disks being, as before stated, at rest, the inclined slots k^1 transfer the wires w to the alternate or intermediate twisting-disks directly beneath the twisted portion of the wires at x^2, and which twisted the same, and the wire w^1 is, by the same means, transferred to the twisting-disk which has the right-hand edge-wire, G, in its eye, and by this disk is carried twice around the G wire, forming the edge and half-mesh w^2.

When the twisting has been accomplished, the wires are again returned by the inclined slots k^1 to the disk from which they were taken, the same inclined slot carrying the same wire from one twister to the same twister and the same notch from which it was taken. From this it appears that when the machine is in operation one-half of the twisting-disks are idle—running, but not forming meshes—one-half of the time, while the others are working to form meshes.

The draw-feed is taken up at the same time that the wires are being transferred from one disk to the other by the transfer-plate, and the length of the meshes is regulated at will by the feed-lever devices, so as to form a long diamond-shaped or square mesh.

The movable pulleys g^2 on the shaft g^1 are moved to the left as the carriers are turning to the left, and to the right as they are turned to the right, so as to lessen the latitudinal motion of the carriers in passing around the wires.

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

1. In a machine for forming wire fabric, a driving spur-wheel, A, provided with two or more lugs, A^2 A^3, in combination with the plates B^4 and B B^4, provided with four or more cams, B B^1 B^5 B^6, as and for the purposes set forth.

2. In a machine for forming wire fabric, the plates B^4 and B B^4, provided with the cams B B^1 B^5 B^6 and the rack *b*, in combination with the pinion b^1, rack *c*, and the plate C, as and for the purposes set forth.

3. In a machine for forming wire fabric, the spools D, mounted on a carrier, D^1, provided with flanges *d* and drivers d^1, as and for the purposes set forth.

4. In a machine for forming wire fabric, the spools D, mounted on a carrier, D^1, provided with flanges *d* and drivers d^1, in combination with the driving-rack F, as and for the purposes set forth.

5. In a machine for forming wire fabric, the combination, with the driving-rack F, of the spool-carriers provided with the spool D and the driving-studs *d'*, the distance between said driving-studs being less than the distance between the bars of the driving-rack F, as and for the purposes set forth.

6. In a machine for forming wire fabric, the driving-rack F, in combination with the spool-carriers D^1 and the plates B B^4 and C, as and for the purposes set forth.

7. In a machine for forming wire fabric, the plate B B^4, provided with the rack *b*, in combination with the pinion b^1 and the plate C, provided with the rack *c*, as and for the purposes set forth.

8. In a machine for forming wire fabric, the plate B B^4, provided with the flanged plates E, in combination with the spool-carriers D^1 and the plate C, having flanges E, as and for the purposes set forth.

9. In a machine for forming wire fabric, the combination of the shaft g^1, carrying two or more fixed pulleys, and one or more movable pulleys, g^2, and the sliding rack G^2, embracing the peripheries of the movable pulleys, as and for the purposes set forth.

10. In a machine for forming wire fabric, the shaft g^1, provided with fixed and movable pulleys, in combination with the spur-wheel M, the bifurcated rod N, crank P, shaft G^3, crank g^3, pitman g^4, and sliding rack G^2, as and for the purposes set forth.

11. In a machine for forming wire fabric, the spur-wheel M, with the stud *m*, in combination with the bifurcated lever N, mounted upon a crank, P, as and for the purpose set forth.

12. In a machine for forming wire fabric, the combination of the spur-wheel M, stud *m*, bifurcated lever N, arm *o*, rock-shaft O, arms o^2, connecting-rods o^3, and the sliding plate K, as and for the purposes set forth.

13. In a machine for forming wire fabric, the twisting-pinions or revolving disks H^3, provided with notches h^8 and eyes h^7, as and for the purposes set forth.

14. In a machine for forming wire fabric, the twisting-pinions H^3, provided with eyes h^7 and notches h^8, in combination with the compound rack H^4, and with means for reciprocating the rack intermittingly, as and for the purposes set forth.

15. In a machine for forming wire fabric, the twisting-pinions or revolving disks H^3, provided with the notches h^8 and the eyes h^7, in combination with the shifting plate K, constructed, as described, with inclined slots k^1 and circular holes *k*, as and for the purposes set forth.

16. In a machine for forming wire fabric, the shifting plate K, provided with the inclined slots k^1, holes *k*, and right-angled slots k^2, constructed and operated as and for the purposes set forth.

17. In a machine for forming wire fabric, the shaft H^5, provided with pinions *b* and b^2, in combination with the plates B B^4 and C, and the rack H^4, as and for the purposes set forth.

18. In a machine for forming wire fabric, the draw-feed roller S, in combination with the rollers T and U, operating together as and for the purposes set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

ISHAM SEDGWICK.

Witnesses:

JAMES J. SHEEHY,

W. N. SEVERANCE.