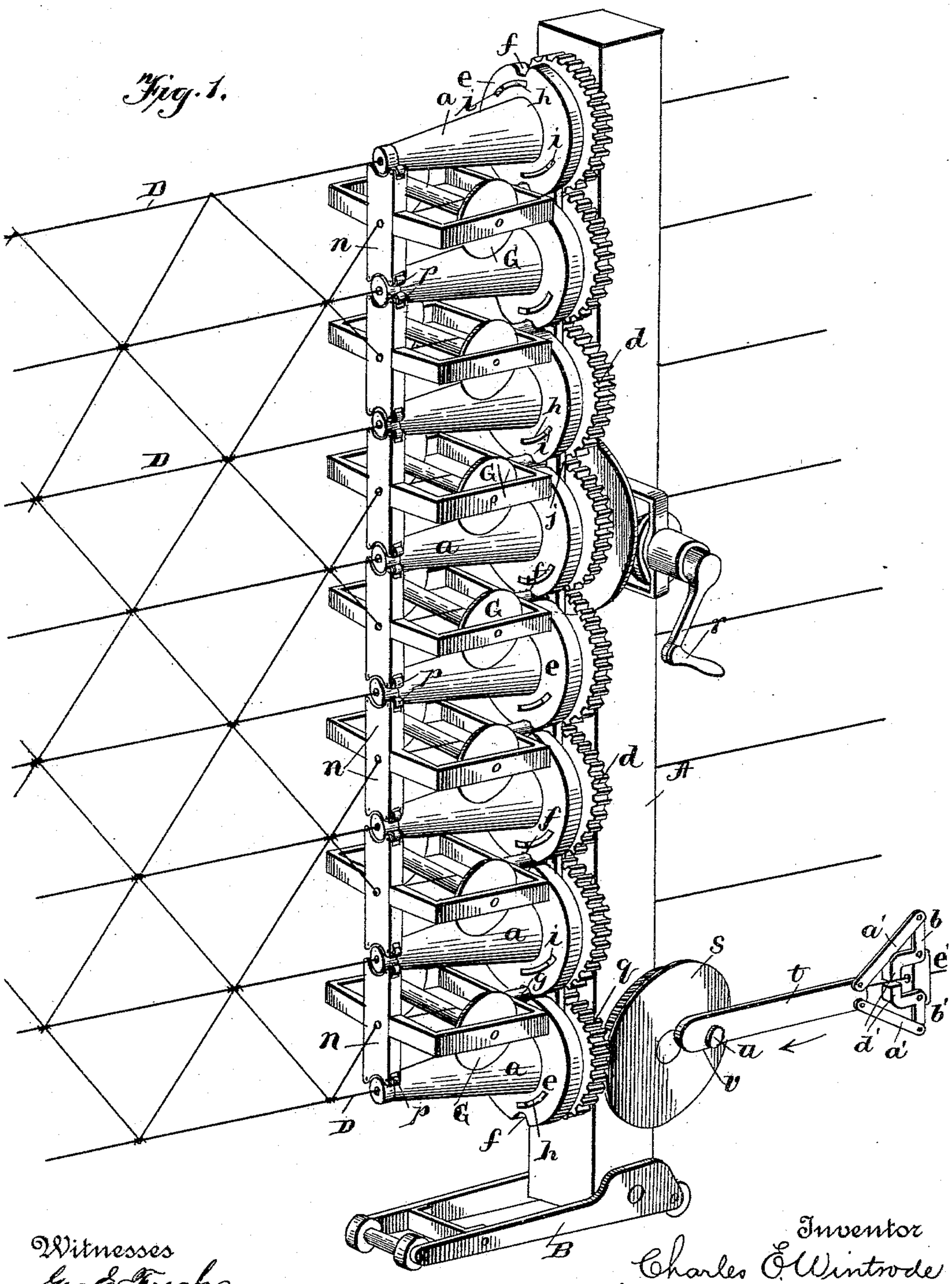
(No Model.) 3 Sheets—Sheet 1.

C. E. WINTRODE.

WIRE WEAVING MACHINE.

No. 598,045. Patented Jan. 25, 1898.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

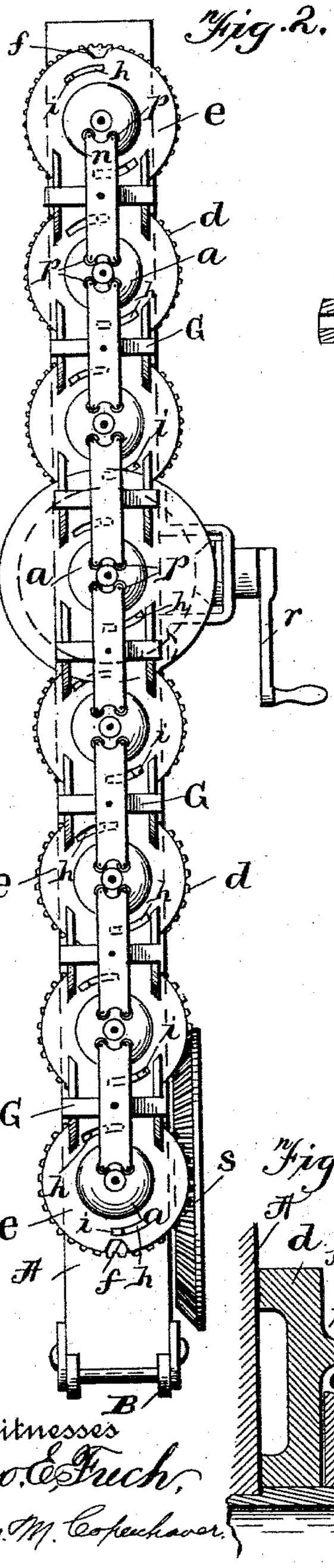

Fig. 6.

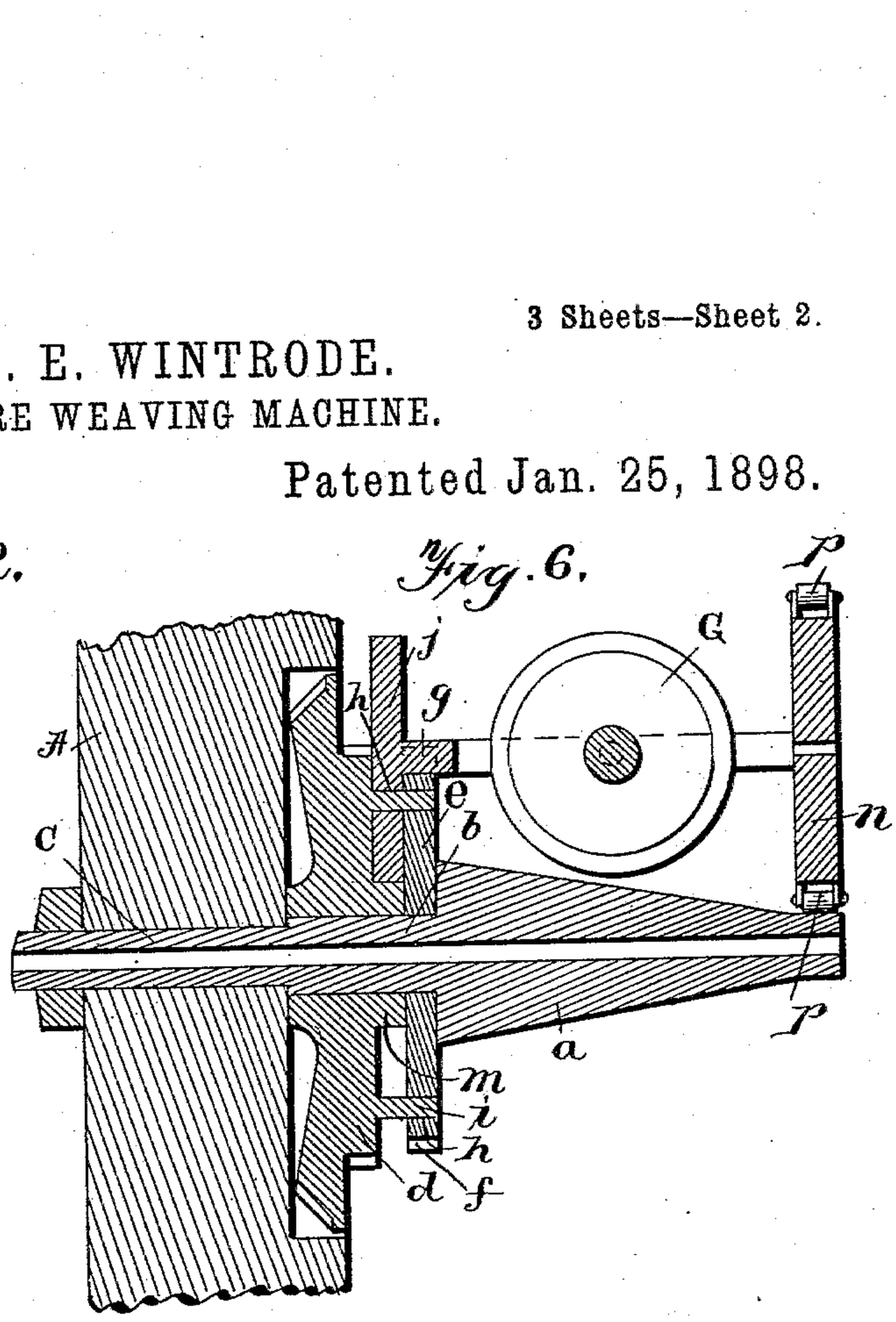

Fig. 7.

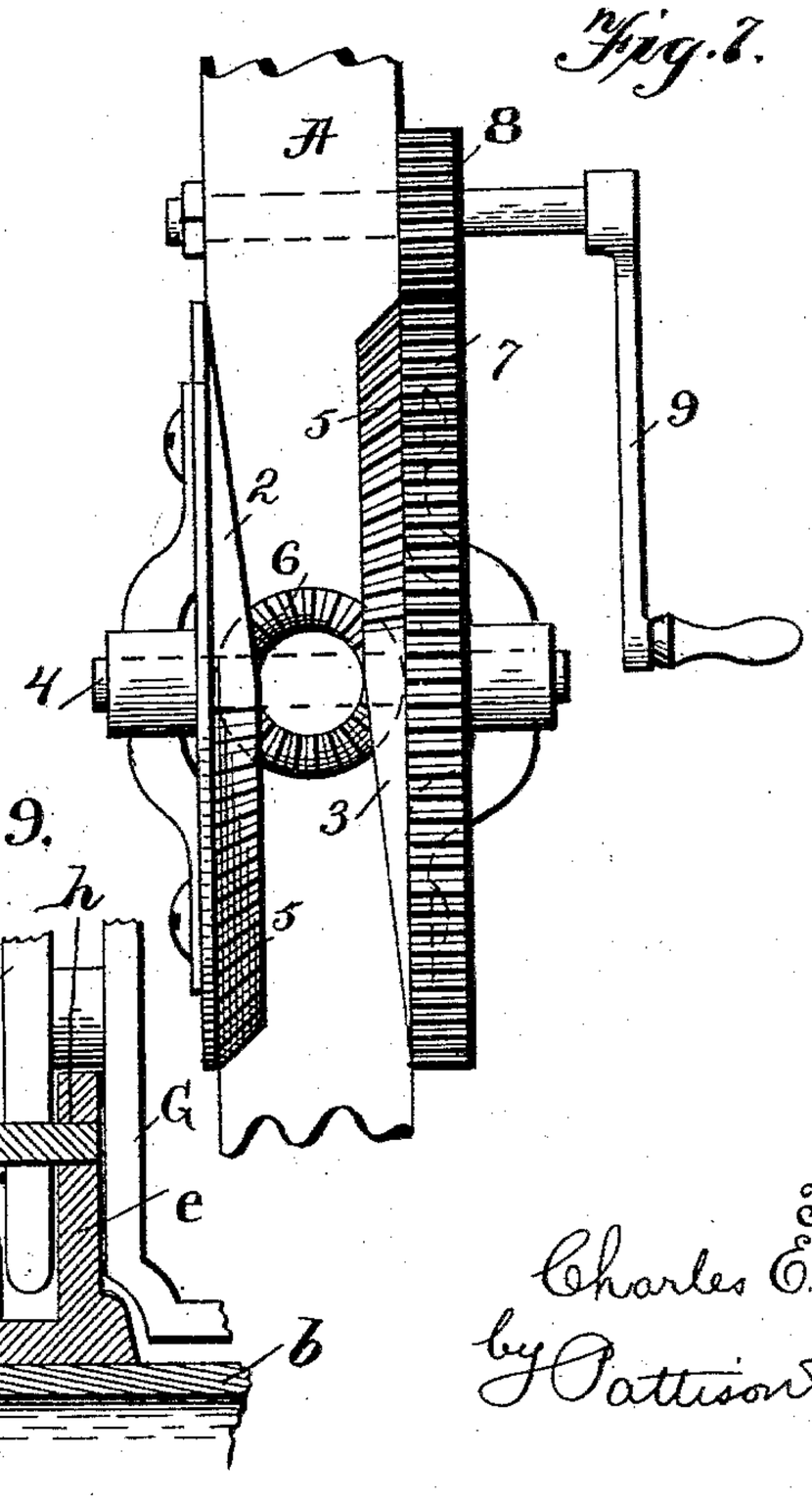

Fig. 9.

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(No Model.) 3 Sheets—Sheet 3.

C. E. WINTRODE.

WIRE WEAVING MACHINE.

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Fig. 3.

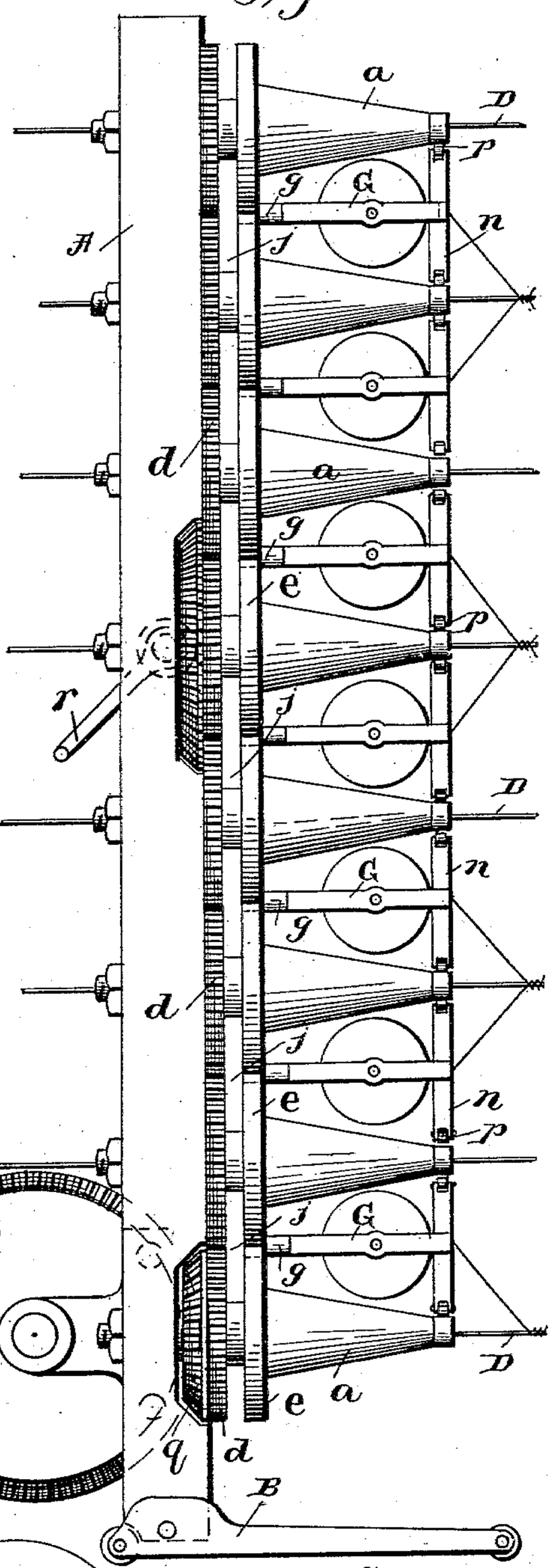


Fig. 4.

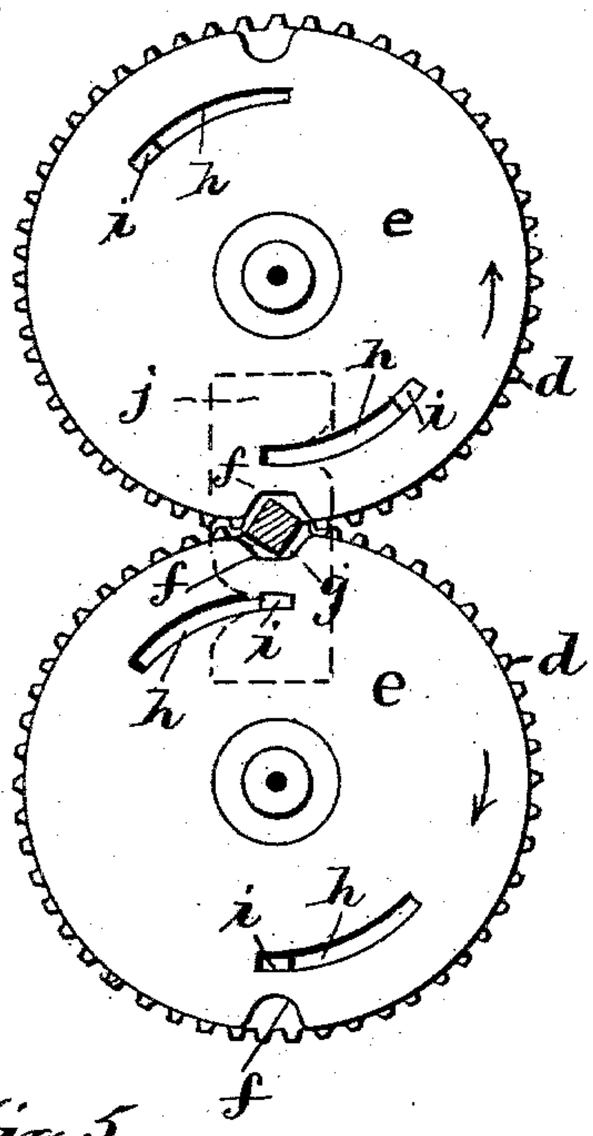


Fig. 5.

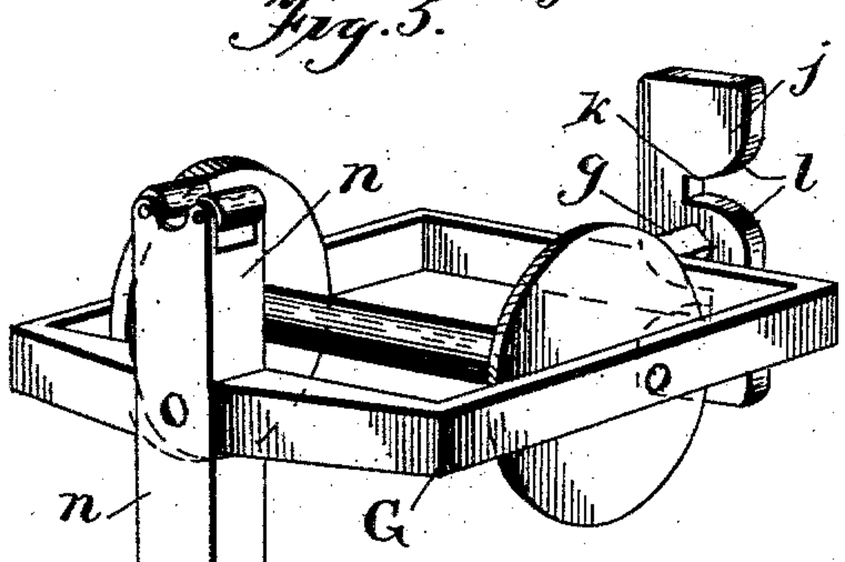
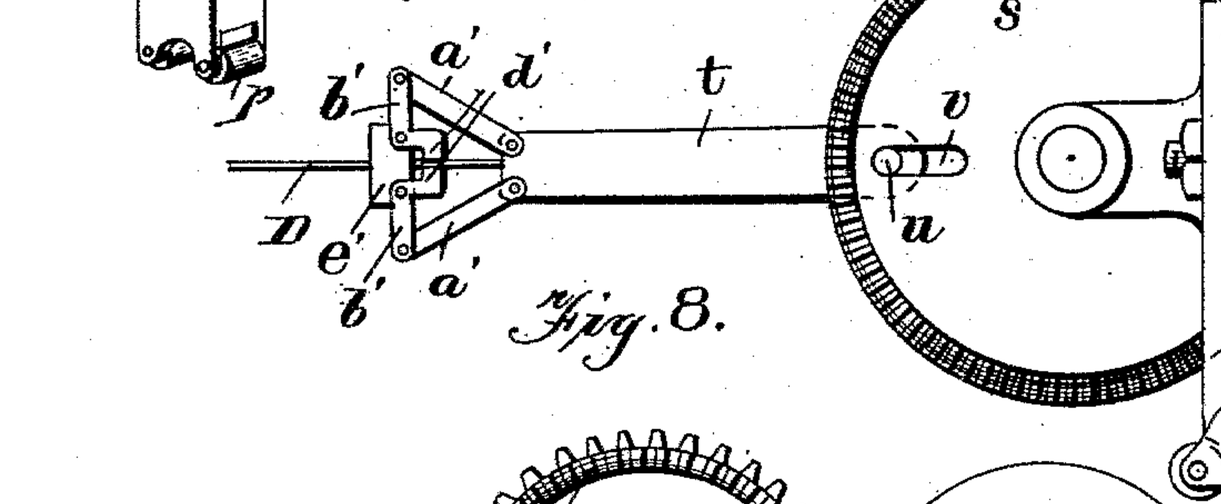
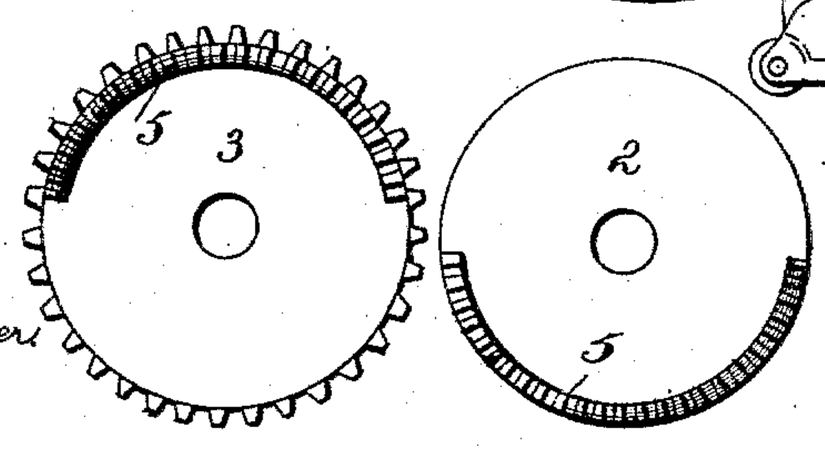


Fig. 8.





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UNITED STATES PATENT OFFICE.

CHARLES E. WINTRODE, OF HUNTINGTON, INDIANA.

WIRE-WEAVING MACHINE.

SPECIFICATION forming part of Letters Patent No. 598,045, dated January 25, 1898.

Application filed July 2, 1897. Serial No. 643,288. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. WINTRODE, of Huntington, in the county of Huntington and State of Indiana, have invented certain new and useful Improvements in Wire-Weaving Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to improvements in wire-weaving machines of that type which are designed to weave wire fences and in which wire-carrying devices are transferred from one actuating member to another for alternately twisting the wire around an upper and lower main wire.

One object of my invention is to provide improved and simple means for transferring the wire-carrying elements from one rotating element to another.

Another object of my invention is to provide a propelling means so constructed that by a continuous rotation thereof in one direction the rotating elements will be rotated alternately in different or reversed directions.

Another object of my present invention is to provide an automatic mechanism for moving the machine along to form the meshes.

In the accompanying drawings, Figure 1 is a perspective view of a machine embodying my invention. Fig. 2 is a front elevation of Fig. 1. Fig. 3 is a side elevation of Fig. 1. Fig. 4 is an enlarged detail front view of two of the rotating elements. Fig. 5 is an enlarged detached perspective view of one of the spool-carrying frames. Fig. 6 is an enlarged sectional view taken through the rotating element used for propelling itself and the other rotating elements. Fig. 7 is an enlarged detached edge view of my improved propelling means or mechanism, and Fig. 8 is a view of the reversing propelling-gears. Fig. 9 is a detached enlarged part-sectional view showing a modified form of carrier-plate.

A designates the supporting-standard of the machine, to which the mechanism is attached, and B a carriage at the lower end thereof. Passing horizontally through this standard are a plurality of spindles C, having enlarged outer ends *a*, which are tapered, as shown. These spindles are hollow, and the main or supporting wires D of the fence fabric pass therethrough, as is usual in this type of machines. Each of the spindles is provided with the reduced portion *b* adjacent to the standard A, and this reduced portion forms a bearing for the rotating elements, which in this instance consist of a plurality of intermeshing gear-wheels *d* and the plates *e*. These plates *e* are provided at opposite edges with the notches *f*, as usual in this class of machines, which notches receive the spindles *g* of the spool-carrying frames G.

In machines of this character the plates *e* and the gear-wheels *d* have been made as one piece and to move together, while in my machine they are independent and are so constructed that they have limited independent movement, and it is through and by this limited independent movement I effect the transferring of the spool-frames from one plate or rotating element to another and thus produce the wire of a fence, as shown in Fig. 1, and which is so well understood by those skilled in the art that a detail description thereof is unnecessary. I will therefore proceed to describe my invention whereby the shifting of the wire-carrying members or frames is effected.

Attention is called to Fig. 4, from which it will be seen that each plate or rotating element *e* or carrier for the wire-carrying element G is provided not only with the usual recesses *f*, but with slots *h* at opposite sides of its center, and that the slots extend in opposite directions from a line drawn vertically through the center of the plates. Each of the gear-wheels is provided with lugs *i*, projecting outward from opposite sides of their centers and preferably near their peripheries. These lugs or projections extend into the said slots, as shown, and are adapted to engage the opposite end walls thereof.

From the above description it will be noted that the gear-wheels have an independent movement in relation to the plates or carrying elements equal to the length of said slots *h*, and that when turned in one direction the projections will travel to one and opposite ends of the slots and when turned in the opposite direction will travel to the other and

opposite ends of the slots, and that when the end of the slot is reached the two elements (the plate and gear-wheel) are then rotatively locked together and that further rotation of the gear-wheel in the same direction will carry the plate with it.

By reference to Fig. 5 it will be noted that the inner end of the spindle of each spool-carrier G is provided with a plate *j* of any suitable form, but here shown oblong. This plate is situated between the gear-wheels and the plates, as clearly shown in Fig. 6. As also illustrated in this figure, the gear-wheels are provided with the extensions *m* for holding the plates away from the gear-wheels a distance equal to the thickness of the plates *j*. This construction, however, may be reversed—that is to say, the plates may have the extension—and the same result of forming a space between the rotating elements for plates accomplished. These plates *j* are provided at opposite sides of the spindles *g* and at opposite edges with oppositely-extending slots or openings *k*, the outer walls of these openings being tapered, as shown at 1, to form cams for the purpose hereinafter set forth. Carrying this construction in mind, the operation of my invention for transferring the spool-carrying elements from one carrying element *d* to another through the independent movement of the wheels and plates is as follows:

The rotating elements *d* revolving in the direction shown in Fig. 4, the upper lug *i* of the lower gear-wheel *d* will be at the right-hand end of the slot *h*, as shown, and enter into the lower slot or opening *k* of the spool-carrying-frame plate *j*. In this position the spool-carrying element is locked to the lower plate *e* and will travel around its center, the rotation of the parts having carried the lower lug *i* of the upper gear-wheel out of the upper opening of the plate *j* and released it, as will be readily understood. It will thus be seen that the lugs serve as locks for locking the wire-carriers to and releasing them from the carrying-plates. The continued rotation of the elements in the same direction will carry the spool-frame around the center of the lower plate *e* the desired number of times. Now by reversing the rotation of the wheels the wheels will rotate independent of the plates, carrying the lug of the lower wheel *d* out of engagement with the plate *j* of the spool-frame and the lug of the upper wheel *d* in engagement therewith, thus locking the spool-frame to the upper wheel and plate, whereby further rotation thereof will carry the spool-frame around the center of the upper wheel and spindle.

It will thus be seen that I have provided a very simple and yet effective manner of automatically transferring the spool-carrying frames from one plate to the other by means of elements which are carried by the rotating elements themselves and independent of any other mechanism. It will also be noted that each transferring element or member is independent of every other transferring element. While I have described the slots and lugs for effecting this transferring action, I do not limit myself to this specific construction, for other constructions for effecting the same result will present themselves to those skilled in the art, whereby the independent movement of the rotating elements can be made to effect the transferring of spool-carrying elements, and also whereby different means specifically can be devised and carried by the rotating elements for effecting the transfer of the spool-carrying elements, instead of having the transferring means apart from and independent of the rotating means. My invention in its broad sense comprehends any means carried by the rotating elements for effecting this transferring action and also any means controlled or operated by an independent movement between the wheels and plates for effecting the transferring of the spool-carrying elements.

As clearly illustrated, the spool-carrying frames are provided with the cross-arms *n* at their outer ends, and the ends of these arms are provided with the rollers *p*. The purpose of this construction is to have a bearing between the frames and the outer ends of the hollow spindles, whereby the outer ends of the spool-frames are supported by the spindles. These rollers rest upon the outer ends of the spindles, which are shaped, as shown, to form a bearing therefor. As illustrated in Figs. 1 and 2, these arms are out of engagement with the spindles adjacent to the spindle around which the frame is rotated. This is accomplished by having the arms *n* a little shorter than the distance between the spindles and by having the cam-shaped outer walls of the openings *k* in the plates *j* of the spool-frames. Owing to this construction, when the lug of one of the gear-wheels engages one of the slots *k* it moves the frame laterally sufficiently to take one end of the arm *n* out of engagement with one of the spindles and in engagement with the end of the spindle around which it rotates, as will be readily understood.

My improvements for shifting the spool-carrying frames can be used in conjunction with the ordinary propelling mechanism such as illustrated in Figs. 1, 2, and 3, and which requires that the operating-crank *r* be rotated first in one direction and then in another to effect a reverse rotation of the gears and plates. However, I have devised an improved construction of propelling mechanism whereby it can be rotated continuously in the same direction and yet impart an alternate rotation of the gears and plates in opposite directions. The means whereby this is accomplished is illustrated in Fig. 7, and consists of two large wheels 2 and 3 at opposite sides of the standard A and rigidly secured to a shaft 4. Each of these large wheels is provided with a bevel-wheel 5, which extends not quite half-way around its circumference, as illustrated in Fig. 8, the remaining portion of the

wheel corresponding with the segmental gear 5 being cut away. These gears are secured to the shaft 4, so that their gears are at opposite sides of their centers. One of the gear-wheels *d* is provided with a reduced bevel-gear 6, adapted to be engaged by the bevel-gears of the large wheels 2 and 3. One of the large gears is provided with a gear 7 around its entire circumference, and with this gear a propelling small gear 8 meshes, which latter is rotated by means of a crank 9. The above construction, as will be readily conceived, effects an alternate reverse rotation of the reduced gear 6 by a continued rotation of the gears 2 and 3 in one direction, owing to the fact that first one bevel 5 of one gear and then the other bevel 5 of the other gear engages alternately opposite sides of the gear 6. This therefore effects automatically a reverse rotation of the gears *d* of the weaving mechanism. The gears 2 and 3 are made of such a diameter that when the gear 5 thereof engages the gear 6 two revolutions thereof will be given by each gear 5, or this proportion may be varied at will without departing from the spirit and scope of my invention. As will be noted, this arrangement effects an automatic reverse rotation of the rotating elements of the machine. I also provide an automatic means for moving the machine along for forming the meshes, and this construction consists specifically of a bevel-gear *s*, suitably journaled to the standard at any desired point and engaging a bevel-gear *q*, carried by one of the gears *d*, whereby it is rotated when the rotating elements of the machine are rotated. A bar *t* has its inner end provided with a wrist-pin *u*, passing through and suitably constructed to be adjustably secured in a slot *v* of the gear *s*. The opposite and outer end of this bar carries an automatically-acting clamp consisting of the two links *a'*, having one end connected to the bar *t* and their opposite ends pivotally connected with the outer ends of bell-crank levers *b'*. The inner ends of these levers *b'* are provided with jaws *d'*, adapted to engage and clamp one of the main wires D of the fence. A block *e'* is provided with an opening through which the main wire D passes, and to this block the bell-crank levers are intermediately pivoted.

The action of the above-described device is as follows: The wheel *s* is made of a diameter twice that of the bevel-gear *q*, so that it requires two revolutions of the gear *q* to effect one of the shifting-gear *s*. A pull upon the bar *t* in the direction indicated by the arrow in Fig. 1 causes the jaws *d'* to clamp the wire, and a further movement in the same direction pulls the machine along. The distance the machine travels, as will be readily understood, can be regulated by the adjustment of the wrist-pin in the slot of the shifting-wheel and thus the size of the mesh regulated. A movement of the bar *t* in the opposite direction by the continued rotation of the shifting-gear either in the same or in a reverse direction causes the jaws to release the wire and move backward thereon for the next hold and movement of the bar *t* for moving the machine the next mesh. It will thus be seen that the movement of the machine for forming the meshes of the fence is made entirely automatic. As this pulling action upon the machine has a tendency to tip the machine forward, to prevent the tipping the carriage B is made to extend forward, as shown.

In the act of transferring the spool-frame from one plate to the other the spool-frame plate cants, which will cause a binding action unless considerable room is provided between the plates and the gear-wheels. To obviate this, the plates may be provided with an internal flange *e''*, between which and the plate the spool-frame plates *j* work, which arrangement will prevent all binding of the plates *j* by any canting thereof, as will be readily understood. This modification of the plates is clearly illustrated in the segmental sectional view Fig. 9. I also prefer to make the notches in the plates *e* and the spool-frame spindle octagonal or angular, as shown, though they may be made circular without departing from the broad features of the invention. It will also be noticed that the plates are not shown as provided with intermeshing gears, for it is designed that they will, through the intervention of the spool-frame spindles, always travel together and always have their notches register when in a vertical line drawn through the machine. However, I desire it understood that if found necessary these plates *e* can be provided with intermeshing gears, which will insure them always traveling together and prevent absolutely any disarrangement of the parts or plates by the jarring of the machine either in use or in transportation. Ordinarily the plates and gear-wheels of machines of this character are united and move firmly together and there is no necessity for such an arrangement. In my machine, however, the plates being independent of the gear-wheels throughout a certain portion of their revolution, I find it in some cases advantageous to couple the plates *e* together by having them provided with intermeshing gears the same as the gears themselves.

Where main wires are used in forming the fence, the old and well-known hollow spindles are used; but should it be desired to weave a fence of the small or weft wires only the hollow spindles may or may not be used, as will be readily understood by those skilled in the art.

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

1. A machine of the character described, comprising a plurality of rotating carrying elements, a wire-carrying element movable between said rotating elements, and shifting members carried by the rotating carrying elements for shifting the wire-carrying ele-

ment from one rotating element to the other by the reversal of the rotating elements.

2. A machine of the character described, comprising a plurality of rotating carrying elements, wire-carriers adapted to travel between them, and locking elements operated by the rotation of the carrying elements, adapted to lock and release the wire-carriers by the reverse rotation of the carrying elements.

3. A machine of the character described, comprising a plurality of carrying elements, wire-carriers adapted to travel between them, and shifting or locking members carried by the carrying elements and adapted to shift the wire-carriers from one carrier element to another by a reversal of rotation of the carriers.

4. A machine of the character described, comprising a plurality of carrying devices each consisting of two members having an independent movement, a wire-carrier adapted to travel between and to be carried by the carrying devices, and locking members adapted to lock and release the wire-carriers to and from the carrying devices by the independent movement of the two members of the carrying devices.

5. A machine of the character described, comprising a plurality of carrying elements, a wire-carrier adapted to be carried thereby, the wire-carrier and the carrying elements having interlocking members adapted to be engaged and disengaged by the rotation of the carrying elements for locking and releasing the wire-carriers alternately from the carrying elements.

6. A machine of the character described, comprising a plurality of rotating carrying elements, wire-carriers adapted to travel between the carrying elements, each carrying element having oppositely-operating locking members actuated by the rotation of the carrying elements, whereby the reversal of rotation of the carrying elements will cause its locking members to lock one wire-carrier thereto and to release the other wire-carrier.

7. A machine of the character described, comprising a plurality of carrying elements each consisting of two members having a limited independent rotation one outside of the other to form a space between them, wire-carriers having members situated between the two members of the carrying elements, and a locking member adapted to lock the carrying-element members together and the wire-carrier between them, by the rotation of the carrying elements.

8. A machine of the character described, comprising a plurality of gear-wheels, a plurality of carrier-plates one for each gear-wheel, the plates having a limited independent rotation in respect to the gear-wheels, wire-carriers carried by the plates, and interlocking members carried by the gear-wheels, plates and wire-carriers; the interlocking members engaged and disengaged by the reverse and independent movement of the plates and gears.

9. A machine of the character described, comprising a plurality of gear-wheels, a plate concentric with and for each gear-wheel, wire-carriers carried by but independent of the plates, the wire-carriers having a projection carried by the gear-wheels or plates adapted to engage and lock and unlock the gear-wheels, plates and wire-carrier members.

10. A machine of the character described, comprising a plurality of rotating elements arranged in concentric relation, a plate for each element and concentric therewith, wire-carriers having members between the rotating elements and plates, the rotating element and plate having respectively a slot and a projection extending thereinto to permit a limited independent rotation between them, the wire-carrier element having an opening adapted to be engaged by the projection, whereby a reverse rotation will lock and unlock the wire-carriers.

11. A machine of the character described, comprising a plurality of carrying elements consisting of two rotating members one being independent of the other and provided respectively with opposite-extending slots at opposite sides thereof and projections adapted to engage the slots, and wire-carriers having members between the rotating members and having oppositely-extending slots adapted to receive said projections, whereby a reverse rotation of the rotating members will alternately lock and release the wire-carrier member with the rotating members.

12. A machine of the character described, comprising a plurality of supporting-spindles, carrier elements rotatively mounted thereon, wire-carriers having their inner ends supported by the carrier elements, the other ends of the wire-carriers having members engaging the outer ends of the spindles for supporting the outer ends of the wire-carriers.

13. A machine of the character described, comprising a plurality of supporting-spindles, carrier elements rotatively mounted thereon, wire-carriers having their inner ends supported by the carrier elements, the outer ends of the wire-carriers having opposite-extending arms adapted to engage the outer ends of the spindles and of a length less than the distance between the outer ends of the spindles, the wire-carriers and carrier elements having engaging cam members adapted to move the carriers laterally to carry one end of their arms out of engagement with one spindle and in engagement with the other.

14. A machine of the character described, comprising a plurality of rotating twisting elements adapted to have a reverse rotation, of a propelling mechanism comprising two gears having teeth at opposite sides of their centers only and approximately around half their circumference, and a coacting driving-gear situated between them and journaled at right angles thereto, whereby the continued

rotation of the propelling-gears in one direction will rotate the twisting elements in reverse directions for the purpose described.

15. A machine of the character described, comprising rotatable twisting elements, a moving or shifting mechanism consisting of a gear operatively connected with the twisting elements, a pitman or bar eccentrically connected with the gear at one end and carrying an automatically-acting clamp at its opposite end, the parts operating substantially as described.

16. A moving or shifting mechanism for a wire-weaving machine, comprising a reciprocating bar operatively connected with the twisting elements of the weaving mechanism, a block supported upon the main wire of the fabric, bell-crank levers intermediately pivoted to said block and carrying at one end jaws adapted to engage said main wire, and links connected with the other end of the levers and with the reciprocating bar, the parts operating substantially as described.

17. A fence-machine, comprising oppositely-rotatable gears or carrying elements, wire-carriers carried thereby, half-gears for propelling the carrying elements in opposite directions by a continued rotation in one direction, the carrying-gears having shifting elements adapted to automatically shift the wire-carriers from one gear to another by the reverse rotation of the gears.

18. A wire-fence-weaving machine, comprising a plurality of rotatable elements, a gear adapted to rotate them, half-gears situated at opposite sides of the propelling-gear operating as described to rotate the rotatable elements in opposite directions, wire-carriers situated between the rotatable elements, the rotatable elements carrying locking elements engaging and disengaging the wire-carriers by a reverse rotation of the rotatable elements for the purpose described, and a reciprocating automatically-acting shifting device operatively connected with the rotatable elements, whereby the half-gears through a continued rotation in one direction effect a shifting of the wire-carriers and a movement of the machine to form the mesh of the fabric.

19. A machine of the character described, comprising a plurality of gear-wheels, a plurality of carrying-plates, spool-frames carried by the plates and provided with plates between the gears and the carrying-plates, the carrying-plates provided with flanges between their inner sides and the adjacent sides or faces of the gear-wheels, substantially as described.

20. A machine of the character described, comprising a plurality of gears, a plurality of concentrically-arranged carrying-plates, the gears and plates intermeshing, and one having a rotary movement independent of the other for shifting spool-carrying frames, and spool-carrying frames carried by the carrying-plates, substantially as described.

21. A fence-machine comprising oppositely-rotating gears or carrying elements, wire-carriers carried thereby, half-gears for propelling the carrying elements in opposite directions by a continued rotation in one direction, and automatic shifting elements for shifting the wire-carriers from one carrying element to the other by the reverse movement of the carrying elements, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. WINTRODE.

Witnesses:
H. W. LOOVER,
JOS. A. CARROLL.