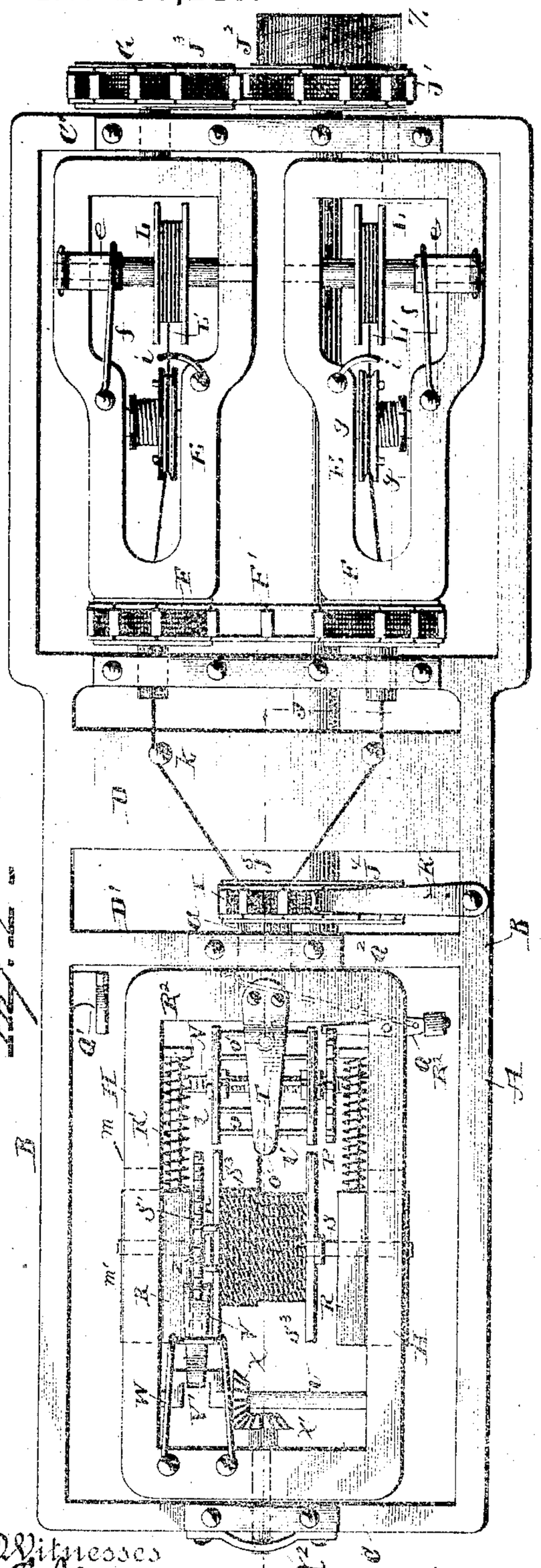
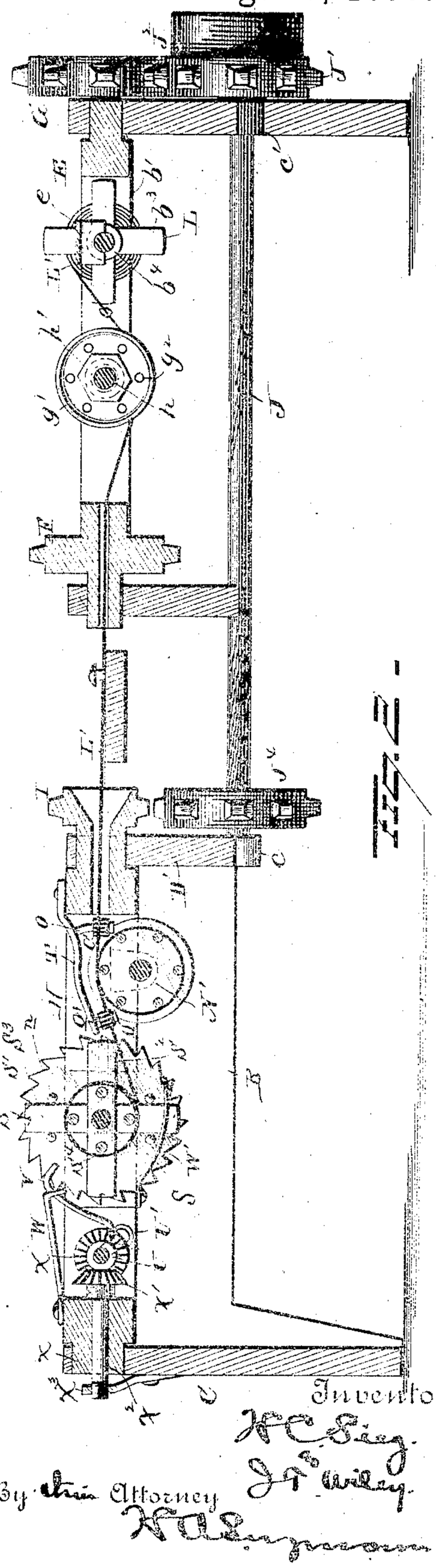
(No Model.) 2 Sheets—Sheet 1.

H. C. SIEG & J. T. WILEY.

MACHINE FOR MAKING WIRE CABLES FOR FENCES, &c.

No. 409,248. Patented Aug. 20, 1889.





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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4

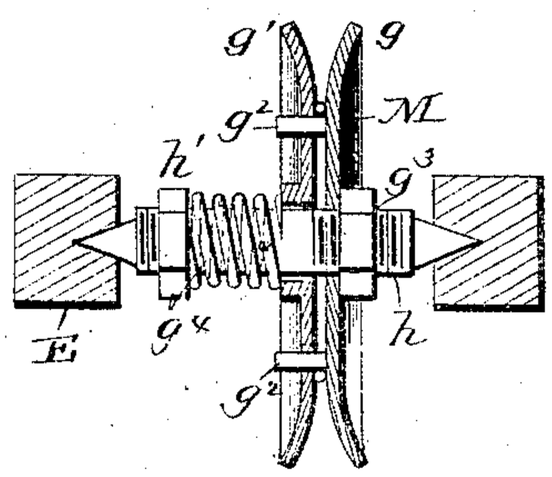


Fig. 5.

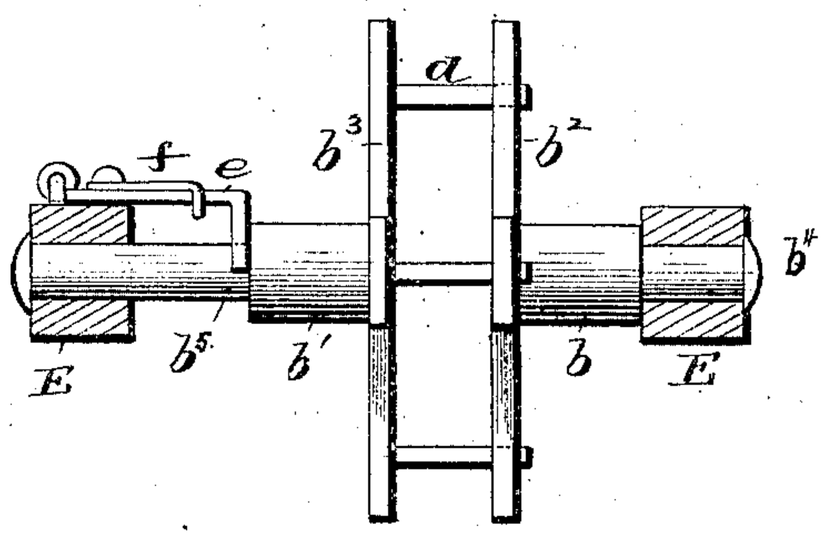
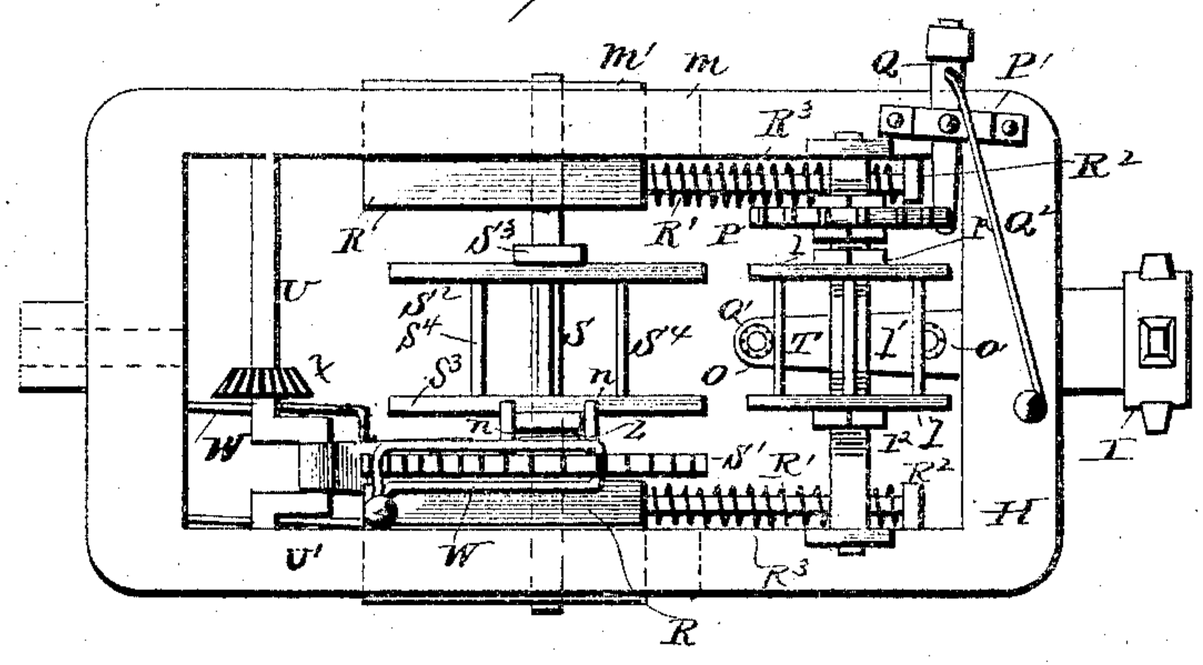


FIG. 3.



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UNITED STATES PATENT OFFICE.

HENRY C. SIEG AND JONAS T. WILEY, OF LISCOMB, IOWA.

MACHINE FOR MAKING WIRE CABLES FOR FENCES, &c.

SPECIFICATION forming part of Letters Patent No. 409,248, dated August 20, 1889.

Application filed October 6, 1888. Serial No. 287,404. (No model.)

To all whom it may concern:

Be it known that we, HENRY C. SIEG and JONAS T. WILEY, of Liscomb, in the county of Marshall and State of Iowa, have invented certain new and useful Improvements in Machines for Making Wire Cables for Fences, &c.; and we 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 appertains to make and use the same.

Our invention relates to an improvement in machines for twisting wire, and more particularly to such as are used in the manufacture of fences.

The object of our present invention is to produce a machine for twisting wire by means of which the twisting of the separate strands of wire is prevented.

A further object is to provide a wire-twisting machine which shall be simple in construction, employ a comparatively small number of parts, and be effective in operation.

A further object is to improve the parts generally which go to make up the wire-twisting machine.

With these objects in view our invention consists in the novel construction and peculiar combinations and arrangements of parts, as will be hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a top plan view of our improved machine. Fig. 2 is a longitudinal sectional view of the same on line Z Z of Fig. 1. Fig. 3 is a bottom plan view of the twisting and winding mechanism. Fig. 4 is an enlarged view of the wire-feeding reels. Fig. 5 is an enlarged view of the feeding tension device.

A indicates a suitable frame-work, comprising side timbers B, end connecting-timbers C C′, and central cross-timbers D D′. Journaled on one of the end timbers C′ and cross-timber D are two revoluble frames E E, provided at or near one end with sprocket-wheels F, fixed to said revoluble frames and adapted to rotate therewith, said sprocket-wheels being connected by a sprocket-chain F′. The journal at the opposite end of one of the frames E is extended somewhat beyond its bearing and provided with a sprocket-wheel G. A frame H is journaled on the end timber C and cross-timber D′, the journal *a* at the inner end of said frame being extended somewhat beyond its bearing and provided with a sprocket-wheel I, preferably about half the size of the sprocket-wheels F. Journaled in boxes *c c′* on the timbers C D′, beneath the revoluble frames E, is a shaft J, which, being extended slightly beyond its bearing on the cross-timber C, is provided with a fixed sprocket-wheel J′, the periphery of the outer portion of said wheel being made smooth to serve as a band-wheel J^2, adapted to receive a strap from any convenient source of power. Motion is imparted from the sprocket-wheel J′ to the sprocket-wheel G by means of a sprocket-chain J^3, passing over said wheels. Keyed to the shaft J near its inner end is a sprocket-wheel J^4, adapted to impart motion to the sprocket-wheel I of frame H through the medium of a sprocket-chain J^5, passing over said wheels J^4 I. An arm K, having a curved inner end, is preferably secured to the side timbers B and adapted to bear at its curved end against the chain J^5 and maintain said chain in contact with the wheels J^4 I.

The frames E E are journaled side by side in the frame-work and geared to revolve in the same direction, and as these frames and attachments are identical a description of one will suffice for both.

The frames E may be made of wood, iron, or other suitable material, and are preferably of oblong shape. Journaled in the outer portion of the frames E are reels L for the reception of a roll of wire L′. As shown most clearly in Fig. 4, these reels L are made in two parts, comprising collars *b b′* and integral arms b^2 b^3, extending at right angles thereto. The collar *b* is loosely mounted on a pin or axle b^4, fixed to and projecting from one of the side bars of the frame E, while the collar *b′* is rigidly secured to a shaft or arbor b^5, journaled in the opposite side bar of said frame, the arms b^2 b^3, projecting from said collars, being opposed to each other and connected by pins *d*, secured to the arms b^3 and adapted to enter perforations in the arms b^2. Before the pins *d* are passed through the perforations in the arms b^2 a roll of wire L′ is put upon the

pins d and the collar b' made to approach the collar b until the pins d of the arms b^3 enter the perforations of the arms b^2.

When the roll of wire shall have been placed upon the reels L, as above described, it is necessary that means be provided for preventing the parts of the reel from separating, and thus releasing the roll of wire thereon. To accomplish this purpose, a plate e is pivoted to one of the side bars of the frame E and has its inner end bent downwardly at right angles and adapted to bear against the collar b' and prevent the latter from leaving the roll of wire L', said downwardly-bent portion of the plate or arm e being cut away to fit over the shaft b^5. A spring f is fixed to the frame E at one end and bears at its opposite end upon the plate or arm e to retain said plate in place.

Journaled in each frame E in advance of the reels L is a tension device M, the construction of which will now be explained.

Two disks g g', having outwardly-turned peripheries, are mounted upon a shaft h, which is preferably screw-threaded throughout the greater portion of its length, a portion at its extremities being left smooth to form journals. The disk g, having short pins g^2 projecting therefrom near its periphery and at right angles to its face, is screwed upon the shaft, and a nut g^3 is also screwed upon the shaft behind the disk g to retain said disk in a fixed position. The disk g', having a central perforation of sufficient size to move over the screw-threads, is next placed upon the shaft, the pins g^2 of the disk g entering and passing through perforations in the disk g', made to receive them. The disks g g' are so placed upon the shaft h that their outwardly-turned peripheries will project in opposite directions, and thus enable the wire to be readily inserted between them, as hereinafter explained. In order to maintain the disks g g' in close proximity to each other and to a certain degree clamp the wires between them, a spiral spring g^4 is made to encircle the shaft h in rear of the loosely-mounted disk g', bearing at one end against said disk and at the other end against a washer h', screwed upon the shaft h. The parts being placed upon the shaft h, as above described, said shaft will be journaled in the frame E in advance of the reels L, as above stated. It will be seen that the tension of the spring g^4, and consequently the tension upon the wire passing between the disks g g', may be readily regulated by screwing the washer h' more or less upon the shaft h. It is of course understood that each frame E is provided with a tension device such as above described. An arm i is secured to each frame E and projected between the reel L and tension device M, and provided at its extremity with an eye, through which the wire is adapted to pass, and thus be guided on its way from the reel [illegible] the tension device M. The journals at the inner ends of the frames E are made hollow and preferably projected somewhat beyond their bearings, as shown in Fig. 1. The inner ends of the frames are provided with perforations which align with the openings in the journals, through which the wires from the reels L are adapted to pass.

The frame H, above referred to, is journaled in the frame-work at the opposite end from the frames E and is considerably larger than the frames E, said frame H being made of wood, metal, or other suitable material.

The journal a at the inner end of the frame H is made hollow and extended somewhat beyond its bearing for the reception of the sprocket-wheel I. A perforation is made in the end of the frame H in alignment with the opening in the journal a, the opening in said journal being made funnel-shaped at its inner end for the reception of the strands of wire from the reels L, said strands of wire first passing around posts k, located on a portion of the frame-work of the machine immediately in front of the opening of the hollow journals of the revoluble frames E.

Mounted centrally on a shaft N, journaled in suitable brackets N', fixed to the side bars of frame H near its inner end, is a tension-reel O. The shaft N will preferably be screw-threaded throughout the greater portion of its length, the extremities being left smooth to form journals upon which the shaft is adapted to rotate in the brackets N'. The reel O may be composed of two disks l, connected at a suitable distance from their peripheries by rods l' and screwed upon the shaft N, the whole being retained in place upon the shaft by means of nuts l^2, screwed upon the shaft behind each disk l. It is evident that the tension-reel O may be keyed upon a smooth shaft, if desired, in lieu of securing it to a screw-threaded shaft, as above described. A toothed wheel P is screwed upon the shaft N near one end and retained in position by means of washers screwed up tight against said wheel at each side thereof. Pivoted in a bracket P', secured to the frame H, Fig. 3, is a lever Q, adapted to engage the teeth of the wheel P at one end and carrying a roller at its opposite end to engage the inclined side of an arm Q', secured to one of the side timbers B, and thus periodically release the wheel P, as explained farther on, the lever Q being normally kept in engagement with the wheel P by means of a spring Q^2, secured at one end to the frame H and connected at its opposite end with the lever Q.

The side bars of the frame in rear of the tension-reel O are provided with elongated recesses m for the reception of tenons m' of two sliding blocks R. Rods R' are secured at one end to one end of the blocks R and adapted to pass loosely at their other ends through perforated lugs R^2, secured to the inner surface of the side bars near the inner ends of the latter. Spiral springs R^3 are made to encircle the rods R', bearing at one end against the lugs R^2 and at their opposite ends against

the sliding blocks R, to maintain the latter in normal rearward position.

Journaled in one of the sliding blocks R at one end and at the other end in a loose sleeve *z*, mounted in the other sliding block R, is a shaft S, carrying a reel S^2, preferably composed of two cross-bars S^3 at each end, secured together at their centers and connected by bars S^4, the shaft S passing through perforations made at the junction of the bars S^3. The reel thus formed is for the reception of the twisted cable, which is wound thereon in a manner explained farther on, and may be placed loosely upon the shaft S and made to rotate with a ratchet-wheel S′, mounted on the loose collar *z*, by means of pins *n*, projecting from the face of the wheel S′ and made to embrace one of the cross-bars S^3. By thus mounting the reel S^2 upon the shaft S it may be removed when filled and replaced by a new one, such removal being permitted by the withdrawal of the shaft S sufficiently to permit the reel to be liberated from the pins *n* and move freely out of the frame.

The strands of wire to be twisted, having passed through the hollow journal *a* of frame H and the perforation in the inner end of said frame, are passed once around the tension-reel O and then to the reel S^2. In order to prevent the wires passing about the tension-reel O from crossing after being twisted, a plate T, secured to the frame H, projects over the tension-reel and is provided with two downwardly-projecting pins *o*, said pins being on opposite sides of the wire—one in rear of the reel O and the other in advance thereof—and having ribbed wheels *o*′ mounted thereon to prevent injury to barbs when such are secured to the wire cable.

In order to draw the strands of wire through the machine and wind the twisted wire upon the receiving-reel S^2, a ratchet mechanism is provided, which operates to rotate the receiving-reel S^2, and thus feed the wire through the machine. A shaft U is journaled in the frame H near its outer end and provided near one end with a crank-arm U′, to which is attached one end of a dog V, the other end of said dog being preferably bent into hook shape and adapted to engage the teeth of the wheel S′ and operate the same as the crank-shaft U is rotated. A spring-arm W, Fig. 3, secured to the frame H, is adapted to bear on the dog V and maintain it in engagement with the wheel S′. A spring-pawl W′ is secured at one end to one of the sliding blocks R at the opposite side of the frame from the dog V, and at the other end engages the teeth of the wheel S′ and prevents said wheel from turning in the wrong direction.

The crank-shaft U is provided with a bevel-pinion X, adapted to mesh with a bevel-pinion X′, fixed to the end of a shaft X^2. The shaft X^2, passing through a perforation in the outer end of the frame H and hollow journal *x* of said frame, is squared at its outer extremity and fitted in a square opening in a bracket X^3, fixed to the end connecting-timber C. Thus it will be seen that the shaft X^2 and its pinion X′ are stationary, and that as the frame H is rotated on its bearings the pinion X on the crank-shaft U will mesh with the pinion X′ on the shaft X^2 and cause the crank-shaft to be rotated.

It will be perceived that the revoluble parts in the frames E E H are all made to rotate at right angles to the direction in which said frames revolve and that the frames E E revolve in the same direction and at the same time as the frame H, thus preventing the twisting of the individual strands of wire before the two strands are twisted together.

The rolls of wire L′ being placed upon the reels L in the frames E, as previously stated, a strand of wire is carried from each of said reels through the eyes of the arms *i*, thence between the disks *g g*′ of the tension devices M. After making one revolution between these disks upon the pins g^2 the wires are carried through the ends of the frames E and their hollow shafts, around the posts *k*, and through the hollow journal of the frame H, where the two strands meet. The two strands of wire, now close together, are carried once around the tension-reel O and then secured to the reel S^2. The machine is now ready for operation.

Motion being imparted to the band-wheel J^2, the frames E E H all revolve in the same direction—the frame H making an entire revolution at each half-revolution of the frames E E—and the two strands of wire will be twisted together between the tension-reel O and the outer extremity of the journal *a* of the frame H. If desired, the gearing may be so arranged as to cause the frames E and H to rotate at the same rate of speed. During the first half-revolution of the frame H the dog V is being withdrawn over the teeth of the wheel S′ by the revolution of the crank-shaft U, and the lever Q engages a tooth of the wheel P, causing a momentary stop of the revolution of the tension-reel O and permitting the twisted wire being wound on the reel S^2 to tighten and be wound closely. During the second half of a revolution of the frame H the lever Q will engage the inclined surface of the arm Q′ and become disengaged from the wheel P, and the crank-shaft will complete its revolution and cause the dog V to engage wheel S′ and cause said wheel to make a partial revolution, thus winding the twisted wire upon the reel S^2 and causing the tension-reel O to rotate until another tooth of the wheel Q is reached. The winding of the twisted wire upon the reel S^2 will also draw the wire through the machine from the reels L of the frames E E, and should it happen that the tension on the wire becomes too great, such excess of tension will be compensated for by the springs R^3 and sliding blocks R. These springs are located in front of and bear against the blocks, and permit the latter, when the tension of the wire is sufficient to overcome the power of the springs,

to move forwardly sufficiently to compensate for the increased tension. Thus it will be seen that the wire holding and twisting mechanism is carried wholly by the revolving frames, and that as all of said frames revolve in the same direction and at the same time the twisting of the separate wires will be to a great extent prevented.

By preventing the individual twisting of the wires a smaller wire may be used, and hence produce a greater length of fence to a given weight than with larger wire of the same weight which is twisted on a machine that twists the individual wires, such twisting tending to weaken said wires.

Many slight changes might be made in the constructive details of our invention without departing from the spirit thereof; hence we do not desire to restrict ourselves to the precise details of construction herein set forth; but,

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a wire-twisting machine, the combination, with a series of revoluble frames carrying reels for wire and a separate revoluble frame carrying a receiving-reel, of gearing for revolving all of said frames in the same direction, a feeding and tension reel mounted in the frame carrying the receiving-reel, and mechanism for intermittingly stopping and releasing said tension-reel, substantially as set forth.

2. The combination, with suitable frame-work, of a series of revoluble frames mounted therein and carrying reels for wire, a frame revolubly mounted in the frame-work and carrying a reel for the reception of twisted wires, a ratchet-wheel and dog, means for actuating said dog for rotating said reel to wind the wire cable and draw said wires through the machine, and gearing for rotating all of said frames in the same direction and operating the ratchet mechanism, substantially as set forth.

3. The combination of a tension device consisting of a screw-threaded shaft made conical at its ends to form journals, two disks having outwardly-flanged peripheries mounted on said shaft, one rigidly and the other loosely, pins secured to one of said disks and passing through perforations in the other, a nut on the shaft, and a spring encircling the shaft between said nut and the loosely-mounted disk, substantially as set forth.

4. The combination, with a frame, a two-part reel, one part of which is movable toward and away from the other part, and a rest for the roll of wire secured to one of said parts, of an arm carried by the frame for locking the movable parts of the reel in operative position with relation to the other part, substantially as set forth.

5. The combination of a reel consisting of two shafts, two collars carrying outwardly-projecting arms, one of said collars being loosely mounted on its shaft and the other revoluble with its shaft, pins fixed to the arms of one collar and projecting into perforations in the other set of arms, and an arm on the frame in which the reel is mounted to maintain the parts in position, substantially as set forth.

6. The combination, with suitable frame-work, of a series of revoluble frames mounted therein, reels for carrying wire mounted in said frames, tension devices also carried by said frames, a revoluble frame mounted in the frame-work, bearings yieldingly mounted in said frame, a reel carried by said yielding bearings for receiving twisted wires, and gearing for revolving all of said frames in the same direction and operating the receiving-reel, substantially as set forth.

7. The combination, with suitable frame-work, of a series of revoluble frames mounted therein, reels for carrying wire mounted in said frames, tension devices also mounted in said frames, a revoluble frame mounted in the frame-work, sliding bearings carried by said frame, a reel for receiving twisted wires mounted in said sliding bearings, springs also mounted in said revoluble frame and bearing on the sliding bearings to maintain the same in a normal rearward position, and gearing for rotating all of said frames in the same direction and operating the receiving-reel, substantially as set forth.

8. The combination, with suitable frame-work, of a series of revoluble frames mounted in the frame-work, reels and tension devices mounted in said frames, a single frame revolubly mounted in the frame-work and carrying a reel for receiving twisted wires, a tension-reel mounted in said single frame in advance of the receiving-reel, a toothed wheel mounted on the same shaft with said tension-reel, a spring-actuated lever pivoted to the frame and adapted to engage said toothed wheel, an arm on the main frame with which the pivoted lever makes contact to periodically release the toothed wheel, and gearing for rotating all of said frames in the same direction and operating the receiving-reel, substantially as set forth.

9. The combination, with suitable frame-work, of a series of revoluble frames mounted therein, reels and tension devices mounted in said frame-work, a single revoluble frame mounted in the frame-work, sliding bearings mounted in said frame, a reel journaled in said sliding bearings for receiving twisted wires, springs also mounted in said single frame and bearing on the sliding bearings of the receiving-reel, a tension-reel mounted in the single revoluble frame, a toothed wheel on the same shaft with the tension-reel, a spring-actuated lever pivoted to the frame-work and engaging the toothed wheel, an arm secured to the main frame with which the pivoted lever makes contact to periodically release the toothed wheel, and gearing to rotate all of said frames in the same direction

and operate the receiving-reel, substantially as set forth.

10. In combination, a tension-reel consisting of two disks mounted on a screw-threaded shaft and connected near their peripheries by a series of bars, nuts on said shaft to retain said reel in a fixed position on the shaft, a ratchet-wheel on the shaft, a spring-sustained lever to engage the ratchet-wheel, and an arm on the frame with which said lever engages to intermittingly release said tension-reel, substantially as set forth.

11. The combination of a receiving-reel mounted on a loose snaft, a ratchet-wheel mounted loosely on said shaft, pins on the face of the ratchet-wheel to engage the reel, a spring-sustained pawl to engage said ratchet-wheel, and mechanism to actuate said pawl to rotate the ratchet-wheel and reel, substantially as set forth.

12. The combination, with suitable frame-work, of a series of revoluble frames having hollow journals at one end for the passage of wire mounted therein, reels and tension devices mounted in said frames, a revoluble frame mounted in the frame-work, having a hollow journal at its inner end for the passage of the wires from the reels on the series of revoluble frames, a tension-reel mounted in said single frame, over which the wires pass after being twisted, a guard secured to the revoluble frame to prevent the twisted cable crossing on the tension-reel, a receiving-reel in rear of said tension-reel, and gearing to rotate all the frames in the same direction and operate the receiving-reel to wind the twisted cable and draw the wires through the machine, substantially as set forth.

13. The combination, with a frame and a reel mounted therein, of a guard-plate secured to the frame and pins projecting from said guard-plate in advance and in rear of the reel, so that a wire passing over the reel will pass on one side of one pin before reaching the reel and on the other side of the other pin on leaving the reel, substantially as set forth.

14. The combination, with a revoluble frame, a reel for wire mounted therein, and a tension-reel also mounted in said revoluble frame, of a guard-plate secured to the frame and extending in proximity to the tension-reel, and pins projecting from the guard-plate, one in advance and one in rear of the tension-reel, substantially as set forth.

15. The combination, with a revoluble frame, a reel for wire mounted therein, and a tension-reel also mounted in said revoluble frame, of a guard-plate secured to the frame and extending in proximity to the tension-reel, pins projecting from said guard-plate, one in advance and the other in rear of the tension-reel, and grooved rollers mounted on said pins, substantially as set forth.

16. The combination, with suitable frame-work, of a series of revoluble frames mounted therein, reels and tension devices mounted in said frames, a single revoluble frame mounted in the frame-work, a receiving-reel in said single frame, a ratchet-wheel mounted on the same shaft with the receiving-reel, a crank-shaft mounted in said revoluble frame, a dog attached to the crank-shaft and engaging with the ratchet-wheel, a spring to maintain the dog in contact with said wheel, a pinion on the crank-shaft, a pinion on a shaft fixed to the frame-work and meshing with the pinion on the crank-shaft, and gearing for rotating all of said reels in the same direction, substantially as set forth.

17. In a wire-twisting machine, the combination, with suitable frame-work, of a series of revoluble frames mounted in said frame-work, the journal at one end of each revoluble frame being made hollow for the passage of wire and having teeth on a portion of its periphery to produce sprocket-wheels, sprocket-wheels on the journals at the opposite end of said frames, a single revoluble frame having a hollow journal, sprocket-teeth on the periphery thereof, and a shaft mounted in the frame-work carrying sprocket-wheels gearing with the revoluble frames, and means for transmitting motion to said shaft, substantially as set forth.

In testimony whereof we have signed this specification in the presence of two subscribing witnesses.

HENRY C. SIEG.
JONAS T. WILEY.

Witnesses:
E. D. WHITACRE,
N. R. HALL.